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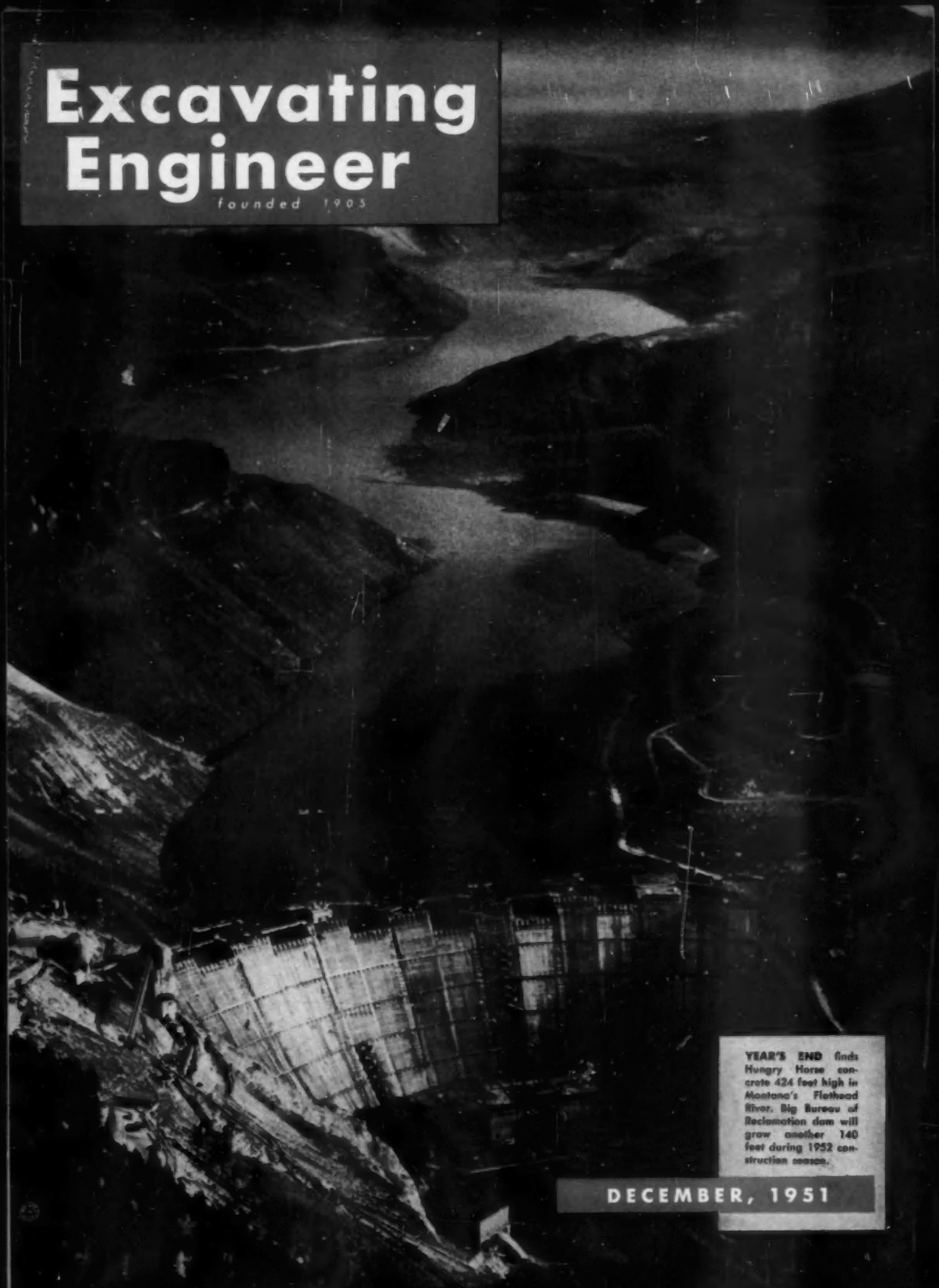

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DECEMBER, 1951

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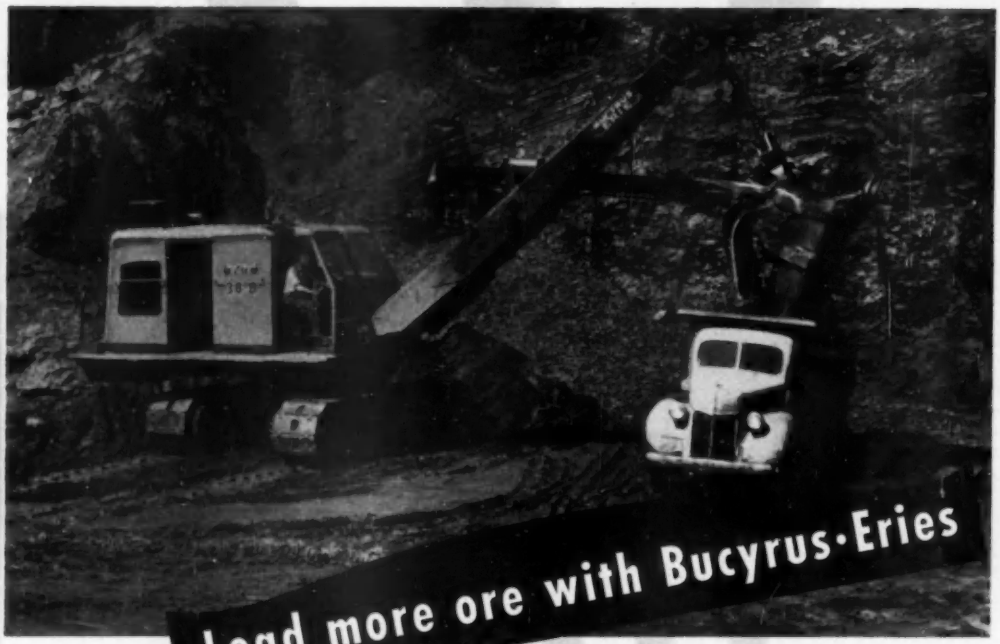

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Excavating Engineer

founded 1905

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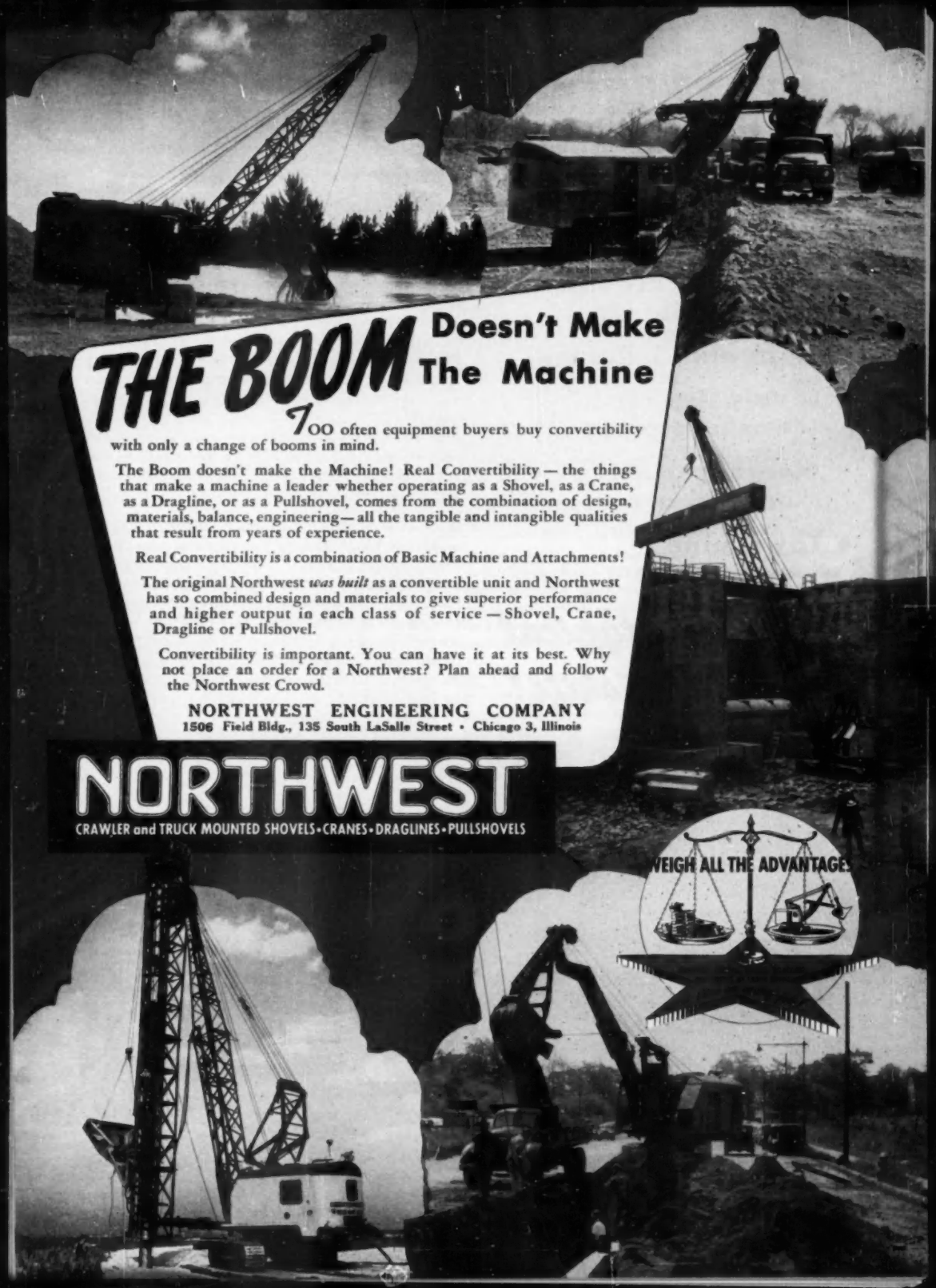

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on Mesabi Iron Range

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▼ *In 10 to 20 minutes* Tournadozer cleans up spillage at each shovel, keeps approaches and turn-around areas clear for the trucks... quickly drives over a mile back to the dump for more leveling.

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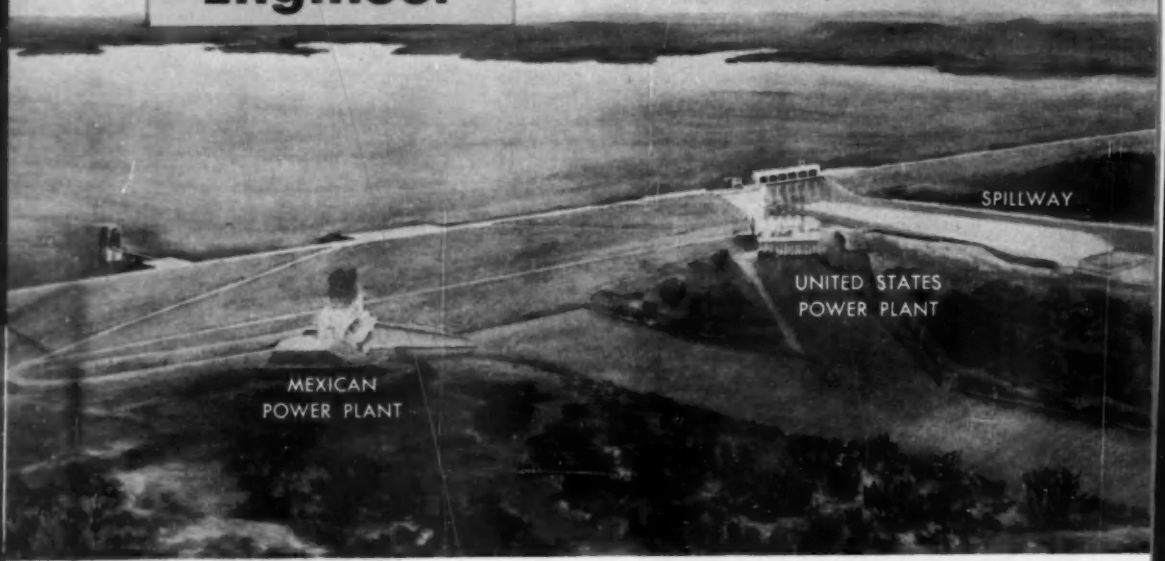


Falcon Dam

by Edward F. London

Under Falcon Dam Constructors and Constructora Intercontinental, S. A., a joint venture of seven prominent contractors, a five-mile-long earth-fill barrier in the Rio Grande River is now under construction. Mexico and the United States cooperated to plan, and now to build the structure which will straddle the international boundary. Here is the first of two articles on the project — an example of the finest kind of international teamwork.

Part I: Planning and Preliminary Work

CONSTRUCTION of Falcon Dam and power plants, first of several large international storage dams and hydroelectric plants scheduled for the Rio Grande River got underway on Jan. 2, 1951, and is now making excellent progress with a 1,000-man Mexican and United States crew, under Constructora Intercontinental, S. A. and Falcon Dam Constructors, a 7-company joint venture.

One of the large storage dams provided for by the Water Treaty of 1944, this five mile long structure, designed for conservation of water, flood protection, and generation of hydroelectric energy, is being constructed jointly by the governments of the United States and Mexico through their respective sections of the International Boundary and Water Commission, headed by L. M. Lawson, Commissioner for the United States; and David Herrera Jordán, Commissioner for Mexico.

An outstanding example of practical cooperation between two neighbor countries, this project is the lowermost of the major international storage dams provided for by the Water Treaty. Each country is bearing its share of the cost in the proportion of the conservation storage allocated to it. Costs of the power plants are divided equally, and the power generated will be divided in like proportion.

Construction work is being performed under two separate contracts; each awarded under the laws of the countries. Work on the United States side is being done under Schedule No. 1, by Falcon Dam Constructors; and on the Mexican side under Schedule No. 2, by Constructora Intercontinental, S. A., a company organized under the laws of Mexico.

All work is supervised by the joint commission, with each section having direct supervision over the work of its schedule. Plans and specifications

for the huge project were prepared by the United States Bureau of Reclamation under the supervision and control of the commission.

The structure is now being built near the town of Falcon, 75 miles downstream from Laredo, Texas, to create a reservoir with a capacity of 4,085,000 acre feet, and a surface area of 114,000 acres at the maximum flow line elevation of 314.2 feet. Upstream from the dam to the towns of San Ignacio, Texas, and San Ignacio, Mexico, a distance of about 40 miles, the reservoir will average about 4.5 miles in width, but beyond these towns it will be contained in the present river channel. Of the total maximum surface area, 55,000 acres are in the United States, and 59,000 acres are in Mexico.

The Water Treaty of 1944 requires that Falcon Dam be completed by early November, 1953. The regulated water supply to be provided is urgently required for the large area of rich farm lands already developed in the lower Rio Grande valley of the United States; and for the development of additional large areas by Mexico on its side of the valley.

Forty-six million sixty-five thousand dollars is the estimated cost of Falcon Dam and power plants, exclusive of cost of lands, construction camps, relocation of highways and utilities, access roads, administration, superintendence and engineering. Estimated cost of the dam without power plants is $33,407,000, pro-rated between the two countries, according to the division of the conservation storage capacity allocated to each: 58.6% to the United States, and 41.4% to Mexico. Cost of the power plants is $12,658,000 split 50-50 between the countries.

Five Miles Long

Falcon Dam is of rolled earth fill construction with a total length of 26,294 feet, of which 10,133 feet is in the United States, and 16,161 feet in Mexico. The crest of the dam, at elevation 323 feet is 35 feet wide, and the maximum height above present river bottom is about 150 feet. The upstream slope is 3:1 with a 20-ft. berm in the river section at elevation 225, and thence a 4:1 slope. The downstream slope 2:1 to elevation 250 and thence 4:1 at elevation 190, where the slope breaks to 2:1 to the original ground surface. In maximum section, distance between upstream

• Above: R. B. Ward, construction engineer, left, and R. B. Collons, resident engineer for the International Boundary and Water Commission look over the construction scene.

• Right: Three of the Mexican supervisors taking part in the operations are, (left to right) V. Zarate, Mexican shift superintendent; A. H. Leal, in charge of Mexican labor and equipment and O. G. Lugo, general resident engineer and secretary of Mexican Department of Hydraulics.

• Below: Standing with their backs to the batch plant are, (left to right) Phil Royer, general superintendent for Falcon Constructors; H. C. Zachau, concrete and carpentry superintendent and Arthur Church, executive assistant.

and downstream toes of the dam is approximately 1,000 feet.

Road Spans Crest

An oil surface roadway with walkway along one side will be constructed along the entire length of the dam, and a beam type guard rail will be installed along both edges of the crest for protection of traffic.

The spillway is located through the left abutment about 1,000 feet from the left bank of the river. This will be a reinforced concrete structure, controlled by six 50x50-ft. fixed wheel gates, with gate sills at elevation 256.7 feet.

Separate outlet works are provided for each country. The United States outlet works consist of a concrete gravity dam section adjacent to the spillway in which are to be imbedded four 13-ft. penstocks, through which water is admitted to the turbines or by-passed to the river channel below. The upper end of the penstocks is protected by a trashrack structure, and admittance of the water to the penstocks is controlled by fixed wheel gates. In the lower end water passing through the penstocks is admitted to the turbines through 84-in. balanced valves, or by-passed to the river through 90-in. hollow jet valves.

Mexican outlet works consist of a 22-ft. diameter penstock whose upper end is located in a tower structure. Water is admitted to the single penstock through a single fixed wheel gate. At the lower end, the single penstock terminates in a manifold section with the water passing through 168-in. butterfly valves to the turbines or by-pass lines to the river through 102-in. butterfly valves.

The power plants, one on each side of the river, are near the downstream toe of the dam and are identical in size, space, generating service and equipment. While each plant will have a centralized control room, and separate and independent facilities, the two will be interconnected for transfer of electrical energy from one to the other.

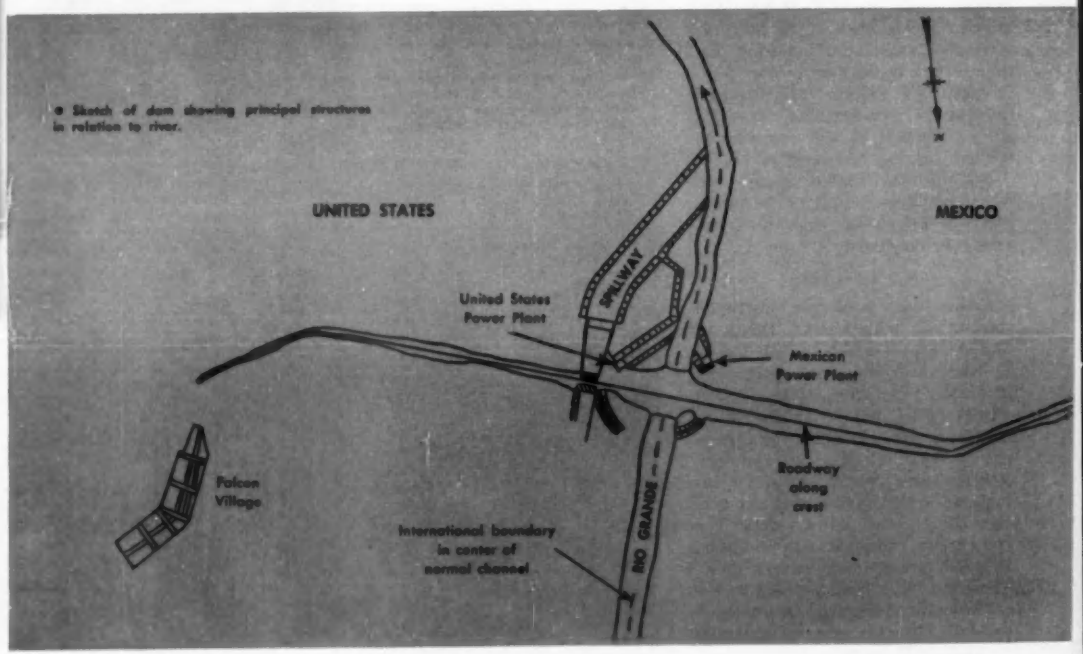
Divide Power Plant Output

It has been estimated that the Falcon power plants will generate annually about 200 million kilowatt hours of prime energy, and 50 million kilowatt hours of secondary energy. Under the Water Treaty, this energy will be divided equally between the two countries.

Following completion of Falcon Dam, water will be released into the river, to diversions and existing pumping plants 100 to 200 miles down river. Within the irrigation area on the U. S. side are 15 major and 300 minor pumping stations serving organized water districts. A number of pumps are operating on the Mexican side of the river in the same area. At the present time, much of the Rio Grande flood flow water is wasting into the Gulf of Mexico. The new dam will regulate this flow as needed.

Another task of the joint commission will be the removal of the population from several towns and communities in the reservoir area. The towns of Falcon, Lopeno and Zapata on the U. S. side and the village of Guerrero on the Mexican side will be inundated when the reservoir fills. The Mexican Government is now building a modern village at their end of the dam for the population of Guerrero.

Texas State Highway 83 will be re-routed from a point just south of the dam site, curving north four miles, and then returning to meet the existing highway at San Ignacio. The U. S. section of the International Boundary and Water Commission has contracted the relocation of Highway 83 to the Texas State Highway Department. Plans for this work are



Sketch of dam showing principal structures in relation to river.

now underway, and contracts will be let by the Texas State Highway Department early this fall.

The I.B.W.C. first started this vast project moving about 15 years ago. However, first surveys and test pits on the dam location started in 1944, as well as the obtaining of rights of way for necessary borrow pits, channels, spoil banks, ditches, roads, etc. The I.B.W.C. is having a tough time getting the reservoir land deal settled because of the uncertainty of ownership, many acres of which go back to early Spanish land grants, with much confusion existing as to boundary lines of the present owners.

The construction of the dam and the formation of the reservoir will produce no change in the international boundary line, which exists in the center of the Rio Grande River. The commission is to establish in the reservoir, by means of buoys or other suitable markers, a practicable and convenient line marking the boundary for the exercise of jurisdiction and control vested in the commission, and for the application of domestic regulations of each country.

An unusual feature of this job is the flexibility of control exercised by the Customs and Immigration Service of both countries in the dam-site area. Although the boundary remains in the center of the Rio Grande River, for dam building purposes a line has been bent back from each side of the river for a distance of 2½ miles forming an international zone within which men, equipment and materials move freely.

Preliminary Work on U. S. Side

Before construction started, commission engineers, under supervision of R. B. Ward, construction engineer, assisted by R. B. Collons, field engineer, had an impressive array of chores to accomplish on the U. S. side.

Not the least of these was building an $800,000 village to house the engineering force. The above figure includes the cost of a water purification plant, water lines, sewers, roads, electric transmission lines and buildings. Later, this town will be permanently occupied by the U. S. operating and maintenance personnel of the dam.

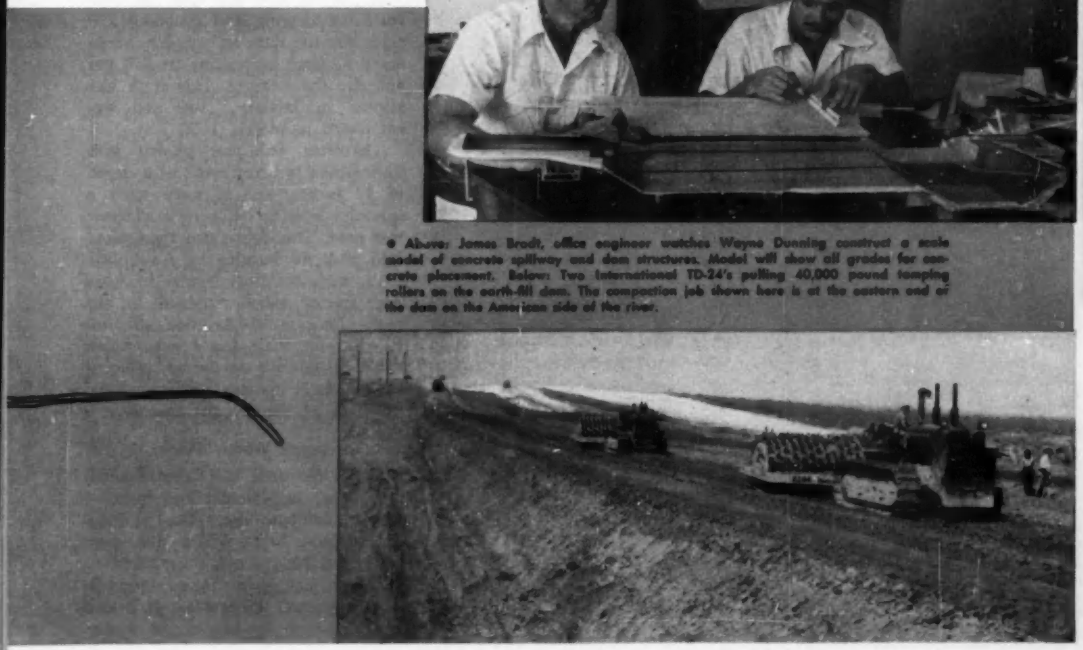
One of the first contracts let was to Fitzgerald and Bradshaw, Inc., Donna, Texas, for the building of the water purification plant, at the bid price of $111,855. This work was started August, 1950 and completed in May, 1951.

This is a pressure filter installation, with primary sedimentation, pre-chlorination, secondary sedimentation with Infilco, Inc. accelerator mechanism, dry chemical treatment and post-chlorination.

All of this equipment was installed in a 3-story concrete and steel building. The building was constructed by Fitzgerald and Bradshaw, in three lifts. Concrete was hoisted by a ½-yd. concrete bucket, swung by a Quickway crane mounted on an FWD truck.

A 2-yd. concrete hopper with bottom dump gate was used as a transfer bin between a 16-S Jaeger concrete mixer and the buggies. The presedimentation basin is a circular tank of reinforced concrete, with Infilco, Inc. sludge mechanism. The treated water storage tank is also of reinforced concrete, circular in design with reinforced concrete dome top.

Initial excavation here was handled by an International TD-14 tractor



● Above: James Brodt, office engineer watches Wayne Dunning construct a scale model of concrete spillway and dam structures. Model will show all grades for concrete placement. Below: Two International TD-24's pulling 40,000 pound tamping rollers on the earth-fill dam. The compaction job shown here is at the eastern end of the dam on the American side of the river.

• Above: Caterpillar D-7 piles gravel over hopper of conveyor system at gravel plant on Mexican side. Below: pilot for Falcon Constructors refuels plane which hauls personnel and materials from points north.

• Below: Powder men placing explosives in holes drilled by wagon drills in center of spillway area on U. S. side. Batch plant is being erected at the right while Caterpillar scrapers and tractors are nearing final grade.

mounting a Bucyrus-Erie blade. Dirt was spread around the site for backfill. Borrow was loaded with a Quickway dragline into trucks, hauled to the site and leveled by the tractor.

While this work progressed, a 2.5 mile strip of county road was relocated by the C & C Contracting Co. of Brownsville, Texas, under a $21,-556 contract. The new road extends from Highway 83 to Chapeno.

Boyd Construction Co., of Waco, Texas, excavated water mains, sewers and laterals for the houses in the boundary commission village with a Cleveland trencher.

Erect Engineering Office

A $57,984 office and garage building was started Nov. 1, 1950 and completed May 18, 1951 by the Noser Construction Co., McAllen, Texas. Of masonry construction with slab foundation, plastered walls, steel sash, celatex ceilings and built-up roof, this office building is now being occupied by Ward and his staff of engineers. When construction of the dam is completed, this building will be the permanent offices of U. S. operating personnel.

Roads and streets were constructed under a $121,562 contract to H. B. Zachery Construction Co., San Antonio, Texas.

H. B. Zachery also had the contract for clearing and grubbing 700 acres for the dam site, under a separate contract amounting to $40 per acre for the clearing. This work was started in January, 1950 and was completed in March, 1950.

The area was first plowed with knife-plows to sever roots at a depth of 12 inches, and in some spots a special contractor-built roller-chopper was used. This debris was then raked into piles for burning by Caterpillar D8's, with bulldozer blades in front and special rakes mounted in the rear. Because of the fine silt soil ganging up with the brush, which made it difficult to burn, the contractor built a special lift on the rakes to let the soil sift through.

Install Water, Sewer

While the area was being cleared, and sewer and water lines installed at the village site, The Chicago Bridge and Iron Works was busy erecting a 100,000-gal. water tank.

Using his own force, engineer Ward directed the erection of houses for personnel, by moving 38 former

army buildings from Fort McIntosh, and the Laredo airport. These have been remodeled into attractive houses in the U. S. village, which is located on a hill between Highway 83 and the dam embankment.

Then the rush started. Thirty major U. S. contractors, represented by over 200 engineers and estimators, arrived in a short period of time to investigate the job site for bidding. Almost all of the contractors were from mid-west and western states.

Many foreign visitors are constantly arriving at the dam site to observe construction methods, from as far away as Australia, Siam and France.

The U. S. section engineers and the contractors supervising personnel have nothing but the highest praise for the energy and efficiency displayed by the Mexican engineers and the other Mexican personnel. When difficulties arise, meetings are held and the problems are licked in short order.

Split Work Schedule

Work on the dam and power plants is divided into Schedule No. 1 and Schedule No. 2. Schedule No. 1, for which the United States Commissioner is the contracting officer, is being performed under contract to Falcon Dam Constructors, at a bid price for labor and a very small amount of materials of $7,801,064.

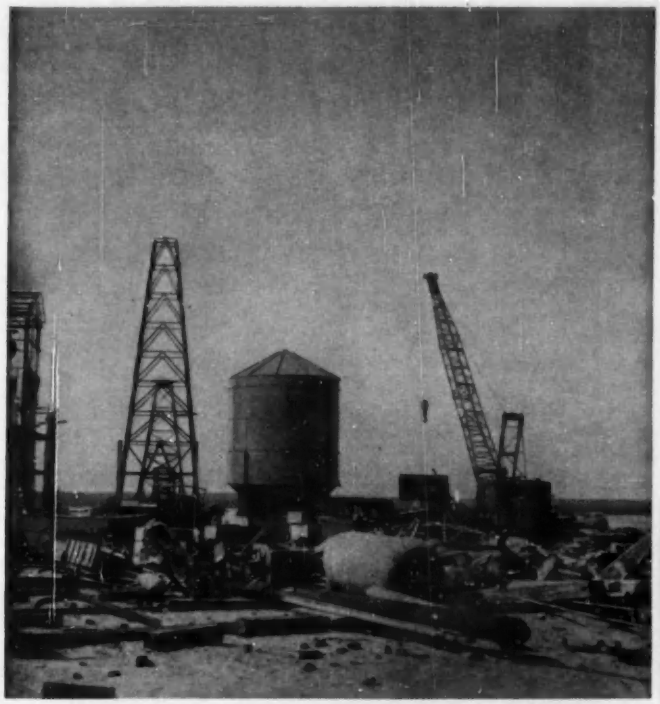
Schedule No. 2 for which the Mexican Commissioner is the contracting officer, is being performed under contract by Constructora Intencontinental, S. A. at contract price of 68,525,000 pesos, mainly for labor, and is to be paid in pesos.

Falcon Dam Constructors and Constructora Intercontinental, S. A. have been formed by the joint venture of the following companies:

Amis Construction Co., Oklahoma City, Okla.; Foley Brothers, Inc., St. Paul, Minn.; Edward Peterson Co., Omaha, Nebr.; Massman Construction Co., Kansas City, Mo.; C. F. Lytle Co., Sioux City, Iowa; San Ore Construction Co., McPherson, Kans.; Tellepsen Construction Co., Houston, Texas.

Expect Early Completion

The Falcon Dam Constructors were low bidders on the Schedule No. 1 contract and Constructora Intercontinental, S. A., were low on Schedule No. 2 contract. According to Phil Royer, superintendent for the entire project, they expect to complete the job ahead of schedule, within an allowed time of 1,050 calendar days.



● Above: Bucyrus-Erie 54-B crane helping to erect the concrete batch plant.

As the bids by the Schedule No. 1 prime contractor are for labor and a small amount of materials only, the remaining materials, except for some steel to be furnished by the contractor on a change order, will be furnished by the U. S. section of the commission. Most of the materials to be furnished by Mexico are being purchased by Constructora Intercontinental, S. A., as agent for the Mexican section.

Cement for Schedule No. 1 (U. S. side) will be shipped from Corpus Christi to the rail head at Rio Grande City, Texas, and hauled by truck to the dam site. Steel is shipped to the job by suppliers.

Steel and cement for Schedule No. 2 (Mexican side) will be hauled from Monterrey, Mexico, to dam site by truck.

All aggregate will come from the Mexican side of the river from a gravel pit opened near the river, and will be hauled to the batch plant on the U. S. side.

Material for building the 5-mile embankment will also be furnished by the commission, and is located in the designated borrow areas near the dam site, except for the riprap which must be hauled by contractor from points on the Mexican side of the Rio Grande River.

Personnel of the engineering staff of the U. S. section of the Commission includes R. B. Ward, construction engineer; R. B. Collons, field engineer; C. F. Dyer, office engineer; D. C. Porter, administrative assistant, H. G. Smith, Jr., engineer in charge of earthwork; C. R. Southwell, Jr., engineer in charge of concrete; and R. F. Bickel, engineer in charge of surveys and powerhouse.

This is the first of two articles on the construction at Falcon Dam — now well under way. The second part of the account will appear in the January Excavating Engineer.

Build Earth Mover Tires

GRADERS, scrapers, tractors and other construction vehicles use the biggest type of tire built by Goodyear Tire & Rubber Co. They range in size all the way from 16.00-24 to 30.00-33, varying in overall diameter from 42 inches to better than 94 inches. Some of the largest of these units weigh more than a ton, are used on vehicles transporting loads up to 50 tons.

Dam-building projects, deep and surface mining, logging, laying of transcontinental pipelines and construction of big buildings are just a few of the jobs these mammoth tires must work on.

• Above left: Workmen place the first band on the machine as the initial step in the building of a 24.00-29 tire. Above: This is one of the early steps in constructing the tire carcass. The bands of the tire are turned around the bead so as to tie the latter into the plies.

Building one takes considerable time. They aren't turned out in a comparatively short period like passenger car tires. It requires from six to 18 hours depending upon size.

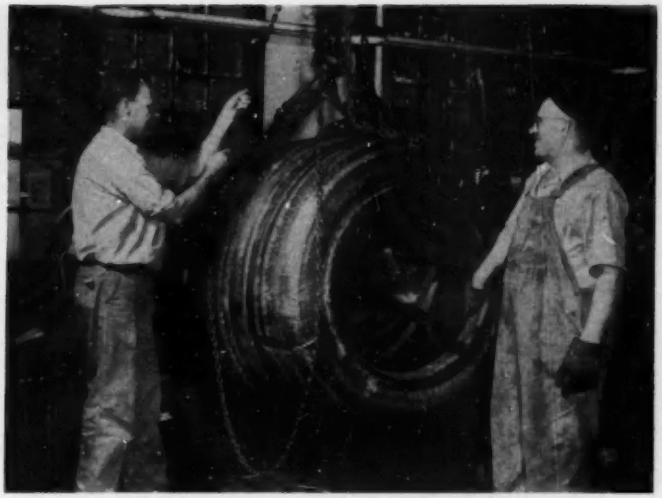
At Goodyear, the men engaged in this work are veteran employees. Construction starts with the placing of the first fabric band of the tire on the tire-building drum. Each band consists of two plies running opposite directions. Successive bands are then added, up to 10 or more (according to tire size) and consisting of from 20 to 40 plies.

The tire's wire beads are added as the construction progresses, there being three different sets of beads which hold the carcass together and serve as its foundation. Then the bands are turned up around the beads, tying them into the plies.

After all the bands have been built up, what is known as a "chafing strip" is placed over the bead area as protection against rim cuts and other damage. A "breaker" band is also added on top of the carcass, acting as a cushion against road shocks and bruises.

Finally, the rubber tread and side-

• This is how the tire looks when completed following curing. This is a grader type tire.



walls are put on. The tire carcass is now complete.

Before the unit goes into the mold for curing, however, there are several more processing steps. They include painting and lining the tire. This is done by applying a soapstone solution inside the casing so that the airbag, which is similar to an inner tube and which is placed inside the carcass to hold it in shape while curing, will not stick to the carcass.

In order to further prevent sticking, the carcass is dusted on the outside with soapstone.

Now comes one of the most important steps in the entire process. The big tire carcass must be brought into shape before curing.

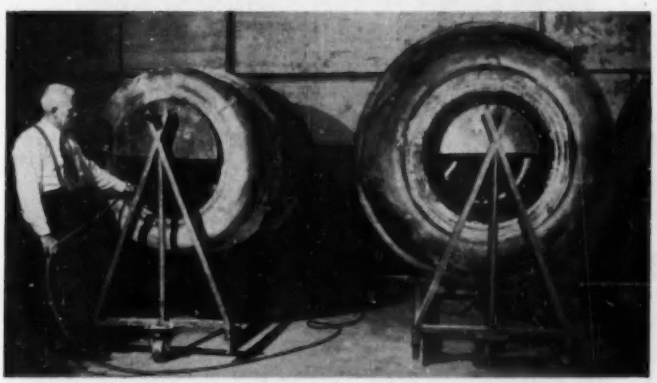
To do this, the tire is placed on a large metal frame, a shaping bag placed inside the tire and the bag inflated. The tire is left in this position about 24 hours. During this interval, the shaping bag and the stretching on the frame bring the carcass to its conventional doughnut shape.

In curing the green tire, it is placed in a huge steel mold, heated and cured at high temperatures from four to 13 hours, according to tread thickness and tire size.

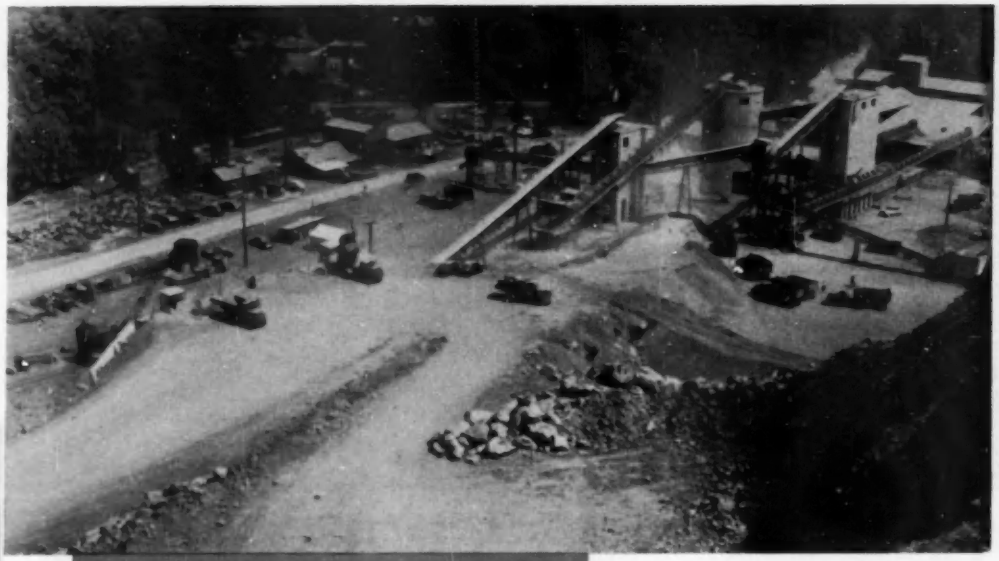
The mold has a top and a bottom section. When curing is complete, the top section is removed by an automatic chain hoist, also used to remove the huge tire.

After trimming off tiny rubber appendages which remain on the tread from curing, and following final inspection, the tire is ready for shipment.

• Above: Operation shown here is described as "stripping the tire" from the building drum. Construction of the tire carcass is now complete and unit is ready for the next processing steps before curing.



• Above: Inflating the shaping bag inside the tire to give it the conventional shape before entering the curing mold. At right, the tire appears near finish of the shaping process as it assumes its final form before curing. Below: Automatic equipment like this is used to lower the big tire into the mold, preparatory to curing.



N. J. Turnpike Needs Spur Quarry Output

• Above: Twin set of electrically operated primary crushers consists of two 48x60 Traylors geared to 500 tac. each. Below: Bucyrus-Erie 75-B electric shovel loads Euclid truck with blasted rock.

by Albert S. Keshen

THE magnitude of the operations behind construction of the New Jersey Turnpike was indicated in the expanded program of the Chimney Rock plant of the North Jersey Quarry Co., which stepped up production two and one half times to meet the demands of paving requirements. This bustling plant produces about 10,000 tons of aggregate stone each day for the highway's surfacing.

Through this close teamwork of quarry and contractor, the turnpike was furnished with paving and a base along a 53-mile stretch from Raritan to Moorestown in the central section.

Situated in the first range of the Watchung Mountains at Bridgewater Township, Somerset County, in the central part of the state, the quarry gets its name from Chimney Rock, a local landmark, which is a nearby geological formation shaped like a chimney. Tradition has it that a love-thwarted Indian maiden flung herself in despair from the top to the raging torrents below in the days before the white man. The odd-shaped rock is painted white so that it stands out like a beacon light over the countryside. It is a favorite spot for Sunday walks and family picnics.

Attracted by this public interest, a hotel was built there by William Haelig. He soon saw the possibilities for a side-line profit in commercializing the abundant supply of indigenous

• Left: General view shows North Jersey Quarry Co. plant and conveyors with administrative offices in left background. Euclids at left feed stock pile. Macks at right await aggregate.

rock in the neighborhood and started quarrying operations on a small scale in 1890. The plant gradually expanded and upon the owner's death his holdings were sold to the present corporation, which is the owner of other stone quarries and plants throughout the northern section of New Jersey.

Stratification Is Perpendicular

Quarrying on a large scale was begun about 20 years ago. The arch-shaped bluff of perpendicular stratification assures a plentiful supply of basalt trapped rock for years to come. With an overall length of 1,600 feet, the height of the formation varies from 200 feet on the south end to 130 feet at the north. An air view of the quarry would show an oblong-shaped depression at one end where excavations have been made, with the vast background of rock surface as yet untouched.

Faced with a contract calling for hundreds of thousands of tons of various sizes of rock to be furnished George M. Brewster & Son, Inc., Bogota, N. J., who installed the largest asphalt mixing plant in the east at Cranbury, N. J., the quarry company and the contractor met the problem of expanded production in characteristic fashion. The latest time-saving machinery and equipment were added, including a fleet of modern trucks, and the working force increased.

Because of the even rock formation, regular drilling patterns followed a normal routine. The drilling was done with Bucyrus-Erie 29-T and Loomis Clipper electric churn drills. The detachable bits are 6⅝ inches.

Blasted rock was loaded in trucks by three Bucyrus-Erie 75-B electrically-operated shovels and two Bucyrus-Erie 54-B Diesel shovels. These crawler mounted units made short work of loading numerous Mack gasoline-driven trucks and Euclid end dumps, Diesel powered.

North Jersey Quarry Co. added equipment to supply George M. Brewster & Son, Inc. with large volume of crushed stone for Turnpike.

The trucks hauled to the primary crusher plant, which from the far end of the quarry was 1,800 feet from blasting operations and at the close end only 100 feet. The twin set of primary crushers consisted of two 48 x 60 Traylors which were geared to 500 tons an hour each, all electrically operated.

From there the load passed along a 48-in. conveyor belt capable of handling 1,200 tph—9,500 to 10,500 tons of finished stone each working day. It went to a 6 x 16 Robbins Gyrex screen, where the minus 2½-in. stone was screened off. The plus 2½-in. material went into two 5'6" Traylor Gyrex crushers for further reduction. The stone passing these crushers was discharged from two 5 x 14 Robbins Gyrex screens, where the turnpike size stone was made. Then all the over size and under size stone was conveyed to the west mill.

The west mill was equipped with six crushers. There the stone was broken down into finer sizes, screened, processed and delivered to a separate set of bins, ready for truck and railroad car loading for the customers.

The dust problem was alleviated by Sly dust collectors plus the application of chemical fogs furnished by Johnson-March Corp.

The end product was shipped by truck or Jersey Central Railroad, which has a siding extending right into the plant yard. Gasoline locomotives were used for the moving of railroad cars in the yard together with Browning Diesel and steam locomotive cranes which were used for the loading of cars and trucks.

As a result of careful scheduling, made possible by efficient machinery and close work supervision, operations moved along satisfactorily. Brewster & Son's fleet of trucks hauled away the thousands of tons of crushed stone daily to stockpiles along the turnpike right-of-way and from these piles it was delivered where needed.

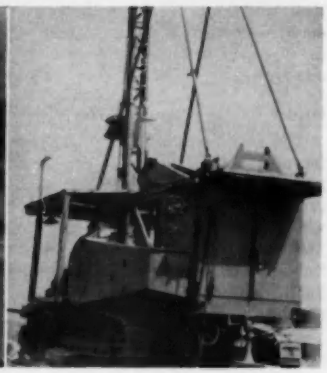
Brewster maintained a service truck patrolling the route equipped with tires, lubricants and all necessary parts for servicing its fleet between destinations. They also had a truck patrolling this route equipped with a magnet to pick up the nails and metals which cause tire failures to their fleet.

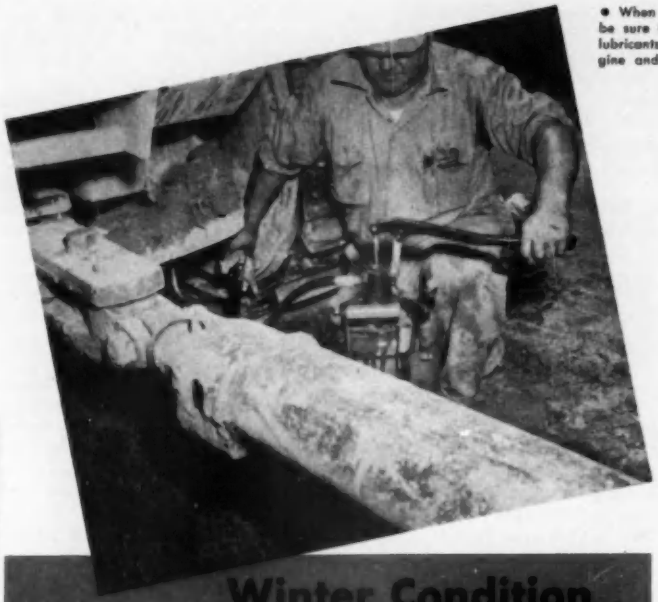
The quarry was also able to meet orders from its regular customers, such as private trade and road contractors and state, county and municipal maintenance departments.

John H. Schmidt is president of the North Jersey Quarry Co., whose principal office is at Morristown, N. J.

William J. Brewster is president of George M. Brewster & Son, Inc., whose principal office is at Bogota, N. J.

• Left: In pit, three Bucyrus-Erie shovels — a 54-B and two 75-B's — dig shot rock. Right: A Bucyrus-Erie 29-T blast hole drill puts down hole to 140-ft. depth.





• When preparing for winter operation, be sure that the recommended grades of lubricants are used in the final drive, engine and transmission.

Winter Condition Your Crawler Tractor

by Fred J. Shreck

Supervisor of Service, Industrial Power, International Harvester Co.

OLD MAN Winter pulls no punches and plays no favorites. Winter downtime will cost you money unless you winter-condition your crawler tractors right now. Cold weather repairs are difficult to make in the field. The strain of low temperature starting and the use of incorrect grades of oil often turns small defects into breakdowns.

So don't even try just "getting by" this winter. Start your preventive maintenance program for crawlers at the first opportunity before the cold sets in.

Inspect for Oil Leaks and Wash Down

The very first thing to do is check for oil leaks. Look for collections of new oily dirt in odd places. And in the case of a dirty engine, look for places where leaking has streaked the dirt. Make the same careful visual inspection of the engine transmission and final drive housings, the sprocket gear and track rollers.

The next step is to clean the tractor and engine—for four basic reasons:

1. Aids proper cooling of engine
2. Oil leaks show up faster
3. Decreases fire hazard
4. Gives operator more pride in his tractor

Proper engine cooling is especially important in cold weather operation because the lighter winter oils run hotter than heavier oils. The oil film protecting moving parts gets thinner as oil temperature rises. Therefore, any crankcase dirt pack left on, impedes proper cooling of light oils reducing their lubricating effectiveness.

Cleaning can be done with high pressure hose or steam. However, a two inch low-pressure stream is preferable. Wipe off the bad spots with Diesel oil or kerosene. Using low-pressure water eliminates the possibility of damage to any gaskets or seal points.

In going over the lubrication system for winter, begin at the crankcase. Engine oil gets heavy with use because the light ends of the oil burn off in combustion leaving the heavier base oil.

Drain old oil from a thoroughly warmed-up engine, preferably after a day's run.

Then flush crankcase with regular crankcase flushing oil—not Diesel fuel or kerosene. (Sometimes when kerosene or Diesel is used, enough is trapped inside to cause foaming of the new oil when crankcase is refilled.)

Run the engine at half-throttle with the flushing oil for half an hour.

Drain oil filter, wipe with clean rags and replace old filter elements with new.

Now refill crankcase with grade of oil recommended by manufacturer for temperature at which tractor is to be operated. Change oil in fuel injection pump but do not flush.

Transmission, final drive and sprocket drive are next on the list. The lubricants in these units become heavier with use. In fact, if high-viscosity lubricants are left in too long, they will lose good lubricating characteristics and tend to "channel" around the moving parts so that the parts run dry. As these units heat up in use, dirty oil on outside of housing is sucked inside through any seal leaks or the ventilator.

Metal-wear particles also become mixed in lubricant. If there is any doubt of this, magnetize a rat-tail file and stick it in the housing. It will come out covered with metal particles that can cause serious wear.

For these reasons drain the lubricant without fail even though the units appear full. Then put in flushing oil, not kerosene or Diesel fuel, and run tractor 15 minutes, not under load. Drain or refill in accordance with manufacturer's recommendation.

Next, refill the lubricating gun with the proper lubricant and force old lubricant out of track rollers with new. Follow this with a complete chassis lubrication. Wipe off excess lubricant. It gathers dirt and is sometimes drawn back into lubricated point by heat. This causes rapid wear.

Electrical System

Clean battery terminals with solution of warm water and baking soda using a wire brush. Dab grease or special paste on terminals and tighten them.

Also check specific gravity of cells with hydrometer. Water level should be brought up with distilled water. Continual low water in battery is an indication of an overcharge condition which calls for corrective action by authorized repair personnel.

Look for worn-out brushes on the

commutator and generator armature. Here again, repairs should be made only by distributor's mechanics.

Voltage regulator, starter and generator should be checked, tested and adjusted. This can be done effectively only by a qualified mechanic using proper testing equipment. This equipment is portable and can be taken to the job-site by most distributors.

In case of a bad connection or corrosion, voltage regulator would not work properly causing high voltage and low batteries. Indications of this are continual low water in battery and premature wear of commutator and brushes.

Next, visually check brushes and bushings of starter and commutator.

Combustion System

For fast starts and peak efficiency during winter, there's nothing more important than proper adjustment of the combustion system. Start by cleaning plugs and properly spacing the gap. Check all spark plug wires and connections.

Adjust or replace magneto or distributor points as needed. Clean magneto impulse coupling with kerosene and lubricate with a light oil. SAE No. 10 is satisfactory in most cases.

Don't overlook the air cleaner. It should be removed and disassembled. Wash out with Diesel fuel or kerosene. Reassemble and fill with recommended grade of oil, usually the same as that used in crankcase.

Be sure to check all air cleaner connections to inlet manifold. See if leaks are indicated and make repairs where necessary.

Diesel fuel filters and water traps shouldn't be passed over. Take them apart and wipe out with clean rags. Otherwise, the water and debris will reduce engine power as fuel gets heavier with cold.

Cooling System

First of all, check for leaks in the head gasket. To do this, remove radiator cap and fill level with cap. Start engine and run long enough to open thermostats. Accelerate suddenly. If bubbles appear, it is a good indication that cylinder head gaskets leak.

Also check for leaks in hose and hose connection and water pump packing. Check radiator for leaks by careful visual inspection.

Flush radiator with flushing compound or a solution of baking soda. Leave off radiator cap and run until hot. Drain and flush with clean water. Drain and refill with the anti-freeze called for by manufacturer.

Also check the fan belt and fan belt drive pulley for looseness and adjust.

A good way to clean the outside of the radiator is to splash water from a 1 pound coffee can through the fins with the engine at high idle. The fan will draw water through radiator and suck out a lot of debris that can't be seen lodged between the fins. *Caution:* There is danger of breaking the fan blades using this method if more water than a 1 pound coffee can full is used at a time.

Engine Ventilating System

To insure proper combustion and lubrication, clean the complete engine ventilation system including crankcase breather on side of engine, breather pipe and elbows on top of valve cover. This step is important because these pipes take out condensation which often causes corrosion and failure of valve springs and rocker arms. This is one precaution that should be underlined. Furthermore, it is recommended that engine ventilating systems be checked frequently during cold weather operation.

For tractors working and parked for extended periods in cold, it's a good idea to equip them with hood sides.

Avoid parking tractor in exposed place for long period without running. If necessary to keep it out in winter, run it at least once every day.

In temperatures of ten degrees or below, dilute oil in air cleaner and crankcase with kerosene in accordance with manufacturer's specifications.

Fill fuel tanks at end of work day to prevent collection of moisture.

Storing Tractors Over Winter

Store in dry and protected place.

Thoroughly wash and clean tractor.

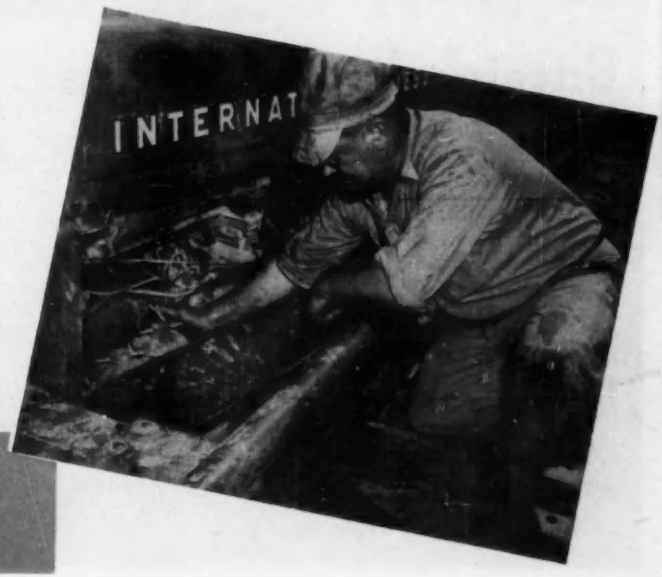
Completely lubricate tractor. Drain Diesel fuel tank, water trap and fuel filters; open air vents to secure complete drainage. Then close vents. Work flushing oil through the fuel injection system as recommended by manufacturer.

Drain all water from cooling system.

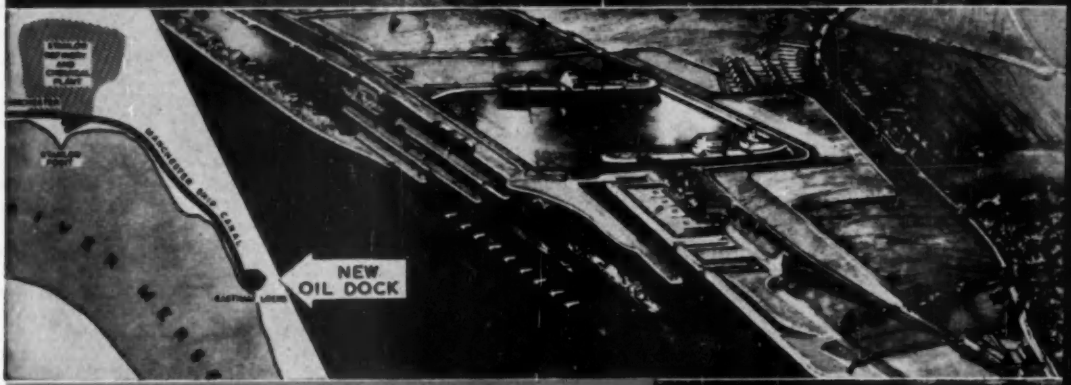
Drain all gasoline from gas tank, strainer bowl and carburetor.

Attach an oil can to an air gun and, using a light oil with rust inhibitor, spray inside spark plug holes, inside the valve cover and all surfaces above oil level. Then spray inside gas and fuel oil tanks.

With these simple precautions, your crawler will last longer when Old Man Winter's chips are down.



• Wise tractor maintenance men are sure to make a periodic maintenance item of removing and cleaning the crankcase breather. This should get special attention for pre-winter conditioning. Cold weather causes more condensation and acid fume conditions than are found in warm weather operation.



Britain's Largest Tanker Dock Takes Shape

By Edmund Updale

THE largest oil dock in Britain is now under construction on a 175-acre site at Eastham, Cheshire. The project will cost nearly $14 million and will accommodate simultaneously four tankers of the largest size—28,000 tons.

Shovel loading to a conveyor-belt system is being used to move excavated soil to spoil banks and 3½ million cubic yards of rock and earth will be removed in all by this method.

A fleet of draglines, shovels and back hoes is now excavating the site. Included are Ruston-Bucyrus 19-RB and 43-RB shovels, Ruston-Bucyrus 33-RB, 43-RB and 54-RB draglines, Lima 802 and 1201 draglines and a Lima 1201 back hoe.

The entrance lock, 800 feet long, 100 feet wide, will have electrically-operated sliding gates.

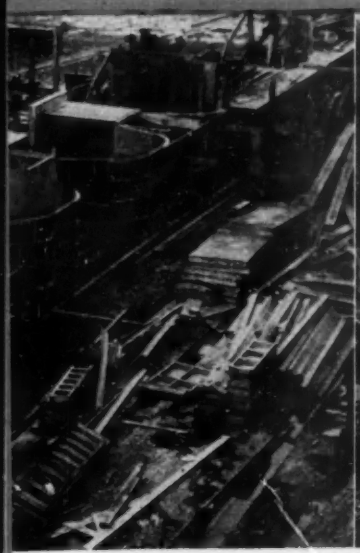
The work is due for completion by mid-1952, and a 7-mile pipeline system will pump newly-arrived crude oil to the Stanlow refinery.

• For left: Lima 802 dragline loading conveyor-belt hopper in upper section of lock. Spoil banks are in background. Center left: Conveyor-belt moving excavated material from river bank. Chains at end of belt section check spillage. Left: Euston-Bucyrus 43 B-S shovel working in dock excavation about 10 feet above finished level.

• Below: General view of excavation from spoil banks. In foreground Euston-Bucyrus 43 and 33 B-S draglines load Euclid trucks. In the distance two Lima 1201 draglines load hopper.

• Left: Artist's sketch of oil dock when completed.

• Lower right: Euston-Bucyrus 33 B-S crane assisting in erection of 15-ton derrick. Behind it a Euston-Bucyrus 54 B-S dragline loads hopper over conveyor belt. Below: Timber forms for outlets from main culverts in river wall of lock take shape.



Modify Tractor for One-Arm Contractor

• Loss of his right arm hasn't stopped William B. Kirk, Kermit, W. Va., from operating his International TD-14 with Bucyrus-Erie dozer. Here Kirk builds a tramroad for a new coal operation near Naugatuck, W. Va.

NINE years ago, they said William B. Kirk of Kermit, W. Va., was through as a tractor operator when he lost his right arm on an airport construction job in Maryland.

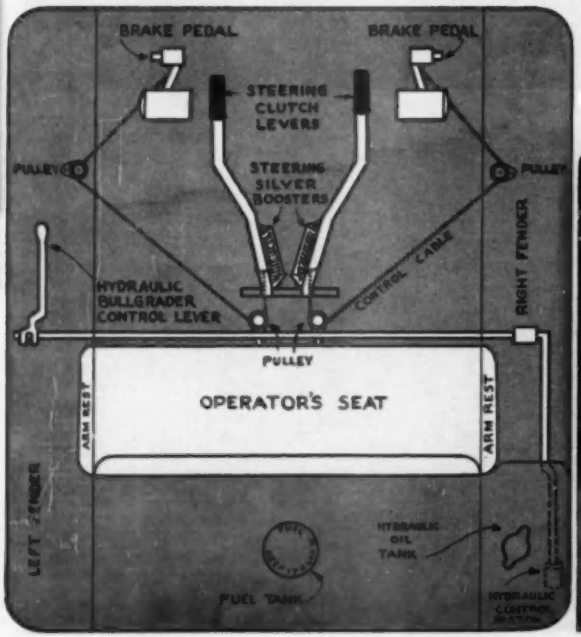
Kirk had an idea that he could operate a crawler tractor with his feet and took his problem to Rish Equipment Co., Bluefield, W. Va. Manual controls on an International TD-14 crawler with Bucyrus-Erie dozer were replaced with a series of pulleys and wire cables, entirely pedal operated. Here is how it was accomplished:

The steering clutch brake adjusting screws were backed off so the brake wouldn't engage until the foot brake pedal is near the end of its travel and the steering clutch levers were adjusted so they have only one inch of free travel. The brake pedals and steering clutch levers were connected with cable and pulleys. One end of the cable was connected to the steering clutch levers and the loose end run through a pulley mounted on the front seat support. The cable was then run through the second pulley, mounted on the fenders, and fastened to the foot brake pedal.

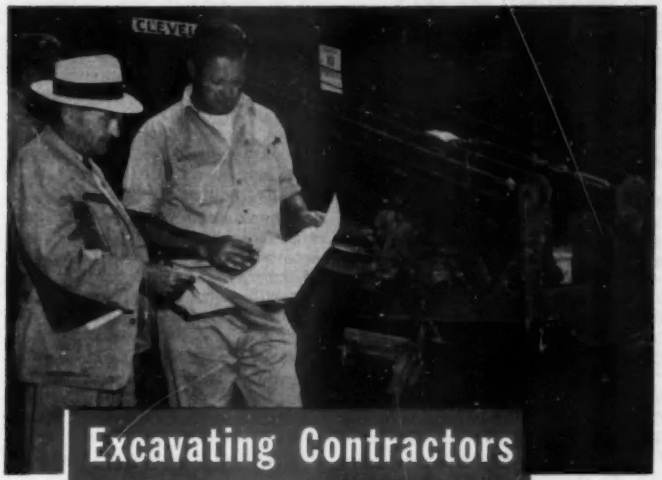
When the foot brake pedal is depressed the steering clutch is released through the cable attachment before the brake is fully engaged. When making a gradual left turn, for example, the left brake pedal is partially depressed. This operates the steering clutch lever on the left side, as would be done by hand. If the brake pedal is depressed further, the brake is engaged and a sharp left turn made just as in normal operation. For a right turn action of the right brake pedal and steering clutch lever is the same.

Silver steering clutch boosters were added to the steering clutch levers to remove some strain from the operator when the clutch is held out for long periods. The hydraulic control for the B-E bulldozer was moved from right to left fender and the operator's left hand is free at all times to work the throttle, master clutch, hydraulic control and gear lever.

This arrangement is working successfully and today Mr. Kirk is running a contracting business and operating a tractor by himself.



• At left is detailed diagram of arrangement that makes one-arm operation possible. Below: Steering clutch boosters, cables and pulleys can be seen.



• W. E. Dice, Pacific Telephone roving subway inspector, reviews underground telephone plant with contractor's foreman.

Excavating Contractors Get Unique Service Free

by Robert J. Green

UNDERGROUND telephone conduits, long a headache for the average utilities and pipeline contractor, are no longer a problem for excavating contractors in the metropolitan Los Angeles area. The danger of accidental cutting of telephone cables has been materially reduced with the inauguration of a unique free service by The Pacific Telephone and Telegraph Co., owners of the Los Angeles underground telephone cable installations. A crew of roving inspectors, with complete maps and other data on every block in the area, is now on constant duty to assist the contractors in protecting the underground installations of the company.

All that an excavating contractor has to do to get the service is dial Pacific Telephone's "contact desk" at RIchmond 0481. If he is outside the main part of the city, he can call ZEnith 0076, a toll-free number. Even the nickel will be returned to him in either case. Within a reasonable time, generally not over two hours, one of the roving inspectors will be on the job. Usually advance planning, say 24 hours, is preferable.

When a roving inspector gets on the job, he usually stays until every intersecting telephone company installation is reviewed. As a rule, contractors are willing to furnish the necessary labor to expose the telephone installations, as experience has proved this to be the only sure way to save damage costs. The company discourages contractors from working closer than two feet to major installations.

The service is a natural outgrowth of "an ounce of prevention is worth a pound of cure" policy which began about 15 years ago. Prior to this service, contractors were spending thousands of dollars a month in damage costs to mend bad breaks in telephone conduits and cables accidentally broken by excavating equipment. The providing of assistance to contractors helps improve telephone service by reducing interruptions. It is this feature that prompted the telephone company to inaugurate the roving-inspector system. The monetary savings are on the contractor's side, as he is usually required to pay all costs when he damages utility property. Many of Pacific Telephone's conduits contain cables with as many as 1818 pairs of wires, and the cutting of such a cable may throw thousands of subscriber telephones out of service or isolate an entire community.

It was such a cable that workmen hit on a rainy day in Pasadena some years ago. In this case, water pressure used to bore across a street quickly seeped into the cable for 57 feet and emergency repair crews worked for two days and nights before the $12,000 repair job was finished. A call before commencing digging might have prevented this damage.

Eight roving inspectors take care of the Los Angeles metropolitan area, and there are inspectors in Santa Ana and Riverside. All of these men were specially picked because they had long years of practical experience with the telephone company, were dependable, and used good judgment. The "contact desk" is open from 8:00 A.M. to 5:00 P.M., and all the inspectors call in frequently to take contractors' requests. The service is maintained 24 hours a day by having the emergency desk, TUcker 2221, take care of calls which come in at night or over week ends.

Pacific Telephone management pointed out that contractors all over the nation might be able to arrange with their respective telephone companies to obtain a somewhat similar service.

Southern California contractors are very well pleased with the unique service since it saves them valuable time and damage claims. Wide circulation of the scheme is being promoted throughout the Southern California area through the Associated General Contractors of America.

• Damage to telephone exchange cable after being ripped accidentally by contractor's ditcher shows exposed pairs of wire which must be individually spliced before service may be restored.

News from the Field

Crane and Shovel Standards Studied by Group

The Munitions Board, Office of the Secretary of Defense, recently announced that a 10-man Industrial Advisory Committee is being formed to help solve the problem of standardization of power cranes and shovels for defense use.

Ten industrial representatives, invited to become members of the committee, met informally in the Pentagon. Lt. Colonel R. H. Pender, USA deputy director of the Standards Agency, presided. Jack W. Moss, Corps of Engineers cranes and shovels authority, was named chairman of the group and Charles L. Miller, Standards Agency, vice chairman.

Industrial representatives attending the first meeting were: P. H. Birckhead, vice president, Bucyrus-Erie Co., South Milwaukee, Wis.; Henry Barnhart, vice president, Baldwin-Lima-Hamilton Corp., Lima, O.; Morgan Ramsey, vice president, Bay City Shovels, Inc., Bay City, Mich.; Fred Salditt, vice president, Harnischfeger Corp., Milwaukee, Wis.; C. B. Smythe, president, Thew Shovel Co., Lorain, O.; William B. Elliott, president, Insley Manufacturing Co., Indianapolis, Ind.; Julien Steelman, vice president, Koehring Co., Milwaukee, Wis.; G. H. Olson, vice president, Link Belt Speeder Corp., Cedar Rapids, Ia.; John P. Courtright, vice president, Marion Power Shovel Co., Marion, O.; and Ralph W. Cornelisen, vice president, Northwestern Engineering Co., Chicago, Ill.

ECA Selects Safety Film

A motion picture produced by the Aetna Casualty and Surety Co., on safety precautions in the construction industry has been selected by the Economic Cooperation Administration for showing in European countries receiving Marshall Plan aid.

Entitled "Ladders, Scaffolds and Floor Openings," the color film is one of a number to be chosen from approximately 6,000 industrial and agricultural movies. They are to be used in conjunction with the ECA's technical assistance program in the 19 countries outside the Iron Curtain.

Prior to being shown abroad, the narrative part of the film will be translated into the language of the different countries where the movie will be used. The foreign audiences will include construction workers, management representatives and safety engineering groups.

The 10-minute production portrays the proper construction of ladders, scaffolds and guards for floor openings, and outlines recommendations for their maintenance and safe use.

Push New York Thruway On Schedule

One-fourth of the New York State Thruway will be completed or under construction by March 31, the State Thruway Authority estimated in an interim report.

Construction is proceeding on schedule on the cross-state superhighway, which will run 535 miles from New York City to Buffalo to the Pennsylvania border. Two sections, totaling 13 miles, already are in use. Construction is under way on another 75 miles, the authority added, and about 140 miles will be completed or under construction by the end of the current fiscal year next March 31 according to the Authority's report.

The authority's report said that sections of the project scheduled to be placed under contract this year would total about 70 miles. The largest will be a 24.5-mile strip south of Rochester, a 10-mile section below Albany, and nine miles between Canastota and Verona, east of Syracuse.

In reviewing the scope of the whole project, the report said an engineering force of 2,400 men, working either for the state or the 35 private firms employed as consultants, will be needed. Also required will be 18,000 construction workers and 20,000 workers to produce the materials.

A total of eighty million cubic yards will be excavated to lay out the route, onto which will go 7,300,000 barrels of cement, 4,000 cubic yards of stone, two million cubic yards of sand and 92,000 tons of steel plus 4,500,000 cubic yards of concrete pavement.

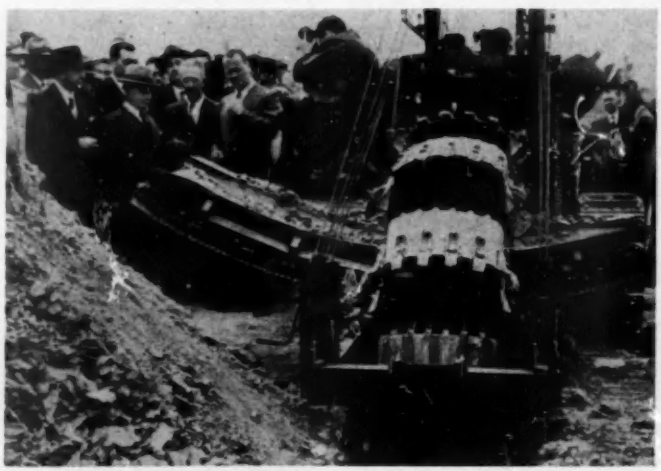
Members of the authority are Bertram D. Tallamy, chairman; David J. Martin, vice chairman, and R. Burdell Bixby, secretary-treasurer.

Asbestos Sought in Wis.

A $5,000 contract to explore for reserves of asbestos — a strategic and critical mineral with important insulating uses — in Marinette County, Wis., has been entered into between the government and industry.

Under terms of the Defense Minerals Administration contract, the government will contribute 90% or $4,500 to the cost of the project, and the Star Mining Co., of Madison, Wis., the operator, the remaining amount.

Stripping of the overburden by a bulldozer around a small outcrop containing chrysotile—one of the most abundant and useful of the asbestos



• President of Brazil Senor Getulio Vargas and his party observe a Cleveland trench digging machine in operation as it dug a utility-lines trench to start construction of a new branch line of the Brazilian Central R.R. Shown in the photograph are, left to right: Brigadeer Ararizboia, commander of Brazil's 4th Air Zone; Dr. Joao Cafe Filho, vice president of the Republic; Sr. Vargas, Sr. Lucas Nogueira Garcez (face partially hidden), governor of the State of Sao Paulo, Eng. Contarina and Col. Gomez.

minerals—is now in progress on the Herriman farm about seven miles west of Nathan, Mich. Maximum depth of excavation will be 20 feet in an area covering 80 square feet.

The exploration contract will be completed within 90 days from the time of its recent signing. If the deposit proves to be economic and is mined within 10 years, the operator must repay the government loan through the percentage of royalty realized from mining the area defined in the contract.

The United States produces only about 8% of its asbestos requirements, according to the Bureau of Mines Minerals Yearbook for 1949. During 1950, domestic mines produced 41,358 tons, and producers sold or used 728,786 tons valued at $46,555,867. Most of the domestic asbestos, chrysotile, comes from Vermont and Arizona. Canada supplies the major imports, with some coming from Southern Rhodesia, Africa.

Handicapped Workers Help Build HH Dam

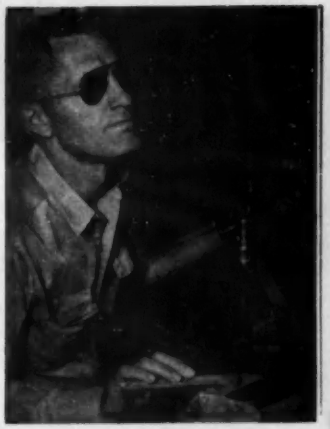
A major role is being played by physically handicapped workers in the construction of Hungry Horse Dam on the south fork of the Flathead River in northwest Montana. The employment of handicapped on jobs they can handle is the policy being followed by General-Shea-Morrison, prime contractor for the dam and power plant. It is pointed out that this policy is the result — not of altruism — but of the knowledge that these men, when placed in the right spots, frequently do a better job than men with unimpaired physical faculties.

Ed Sizer, electrician for G-S-M, had his right leg blown off just below the knee when he and 26 other members of a First Marines' observation post were caught in a deadly hail of machine gun and rocket fire behind the Japanese lines in Okinawa. Today, Ed skis, skates, swims, and packs a bowling average as high as 169. This determination which enabled Ed to overcome his handicap and engage in these sports is a quality that makes him a valued employee.

At the contractor's heavy-duty machine shop Art Stratton has to be careful that he doesn't weld the hook that serves as his right hand to the tractor frame he is working on. Art lost his arm and right leg under a railroad car many years ago. The accident didn't keep him from doing his part as a welder in the Lake Washington shipyard during the second World War.

A majority of the physically handicapped men on the Hungry Horse job

Continued on page 30



• Ralph Olson is literally bolted to his job by the steel and ball bearing wrist that connects his artificial arm to the cableway speed control. General-Shea-Morrison, prime contractor for the multiple-purpose dam and power plant, is doing an outstanding job on employment of physically handicapped workmen. *(Bureau of Reclamation Photo).*

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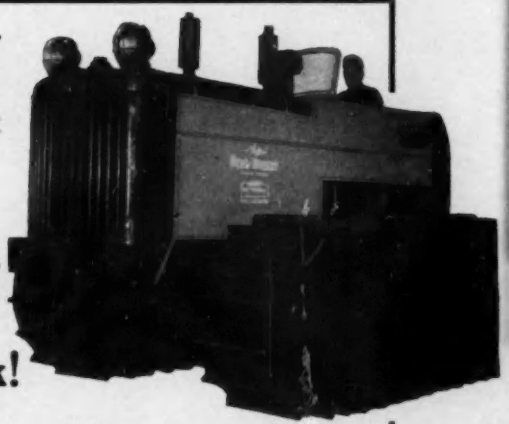

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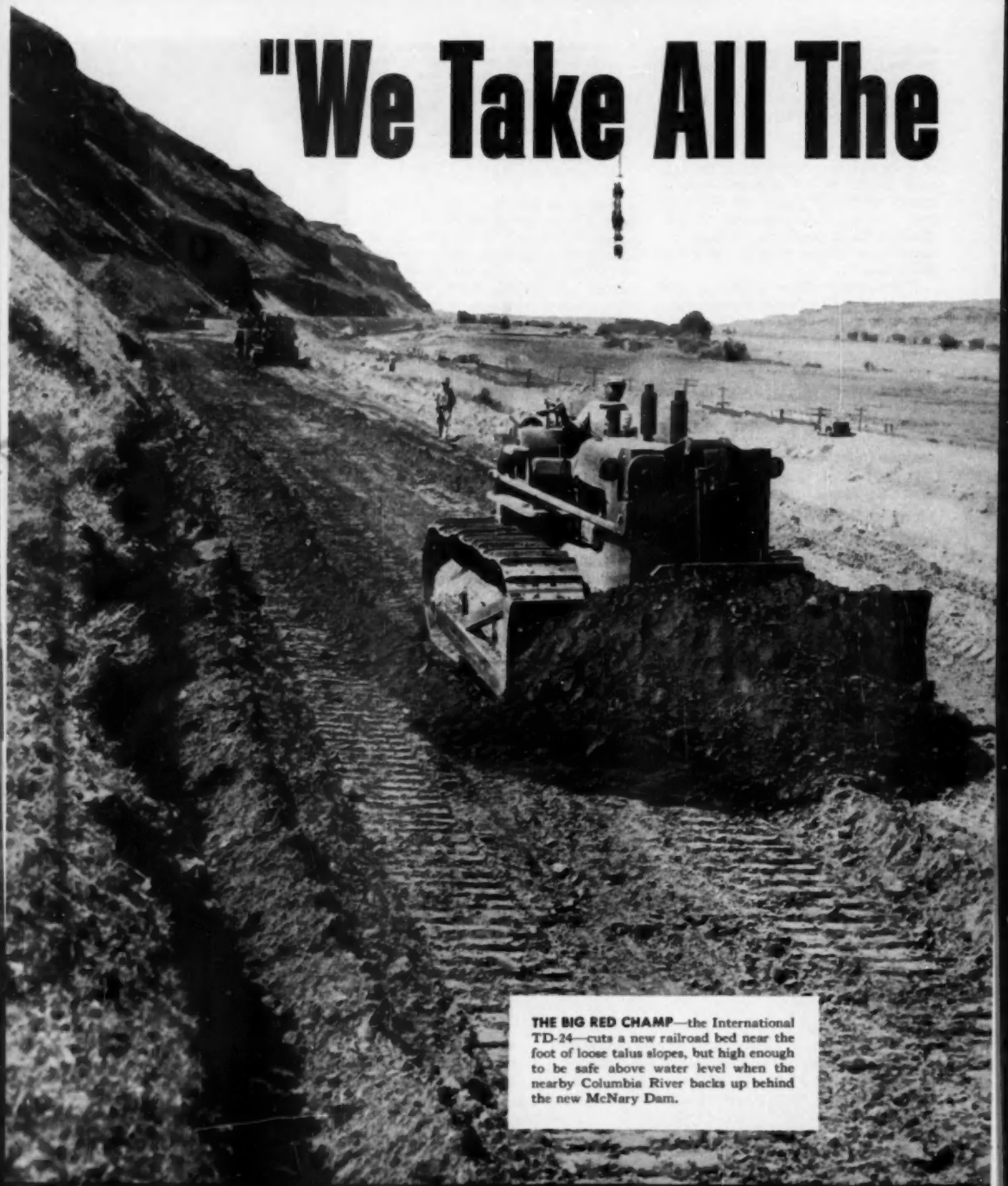
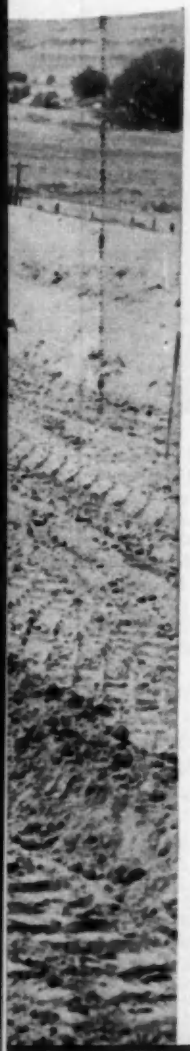


THE BIG RED CHAMP—the International TD-24—cuts a new railroad bed near the foot of loose talus slopes, but high enough to be safe above water level when the nearby Columbia River backs up behind the new McNary Dam.

TOUGH JOBS"

One man and his Big Red TD-24 handle hardest assignments for western contractor



Out on the big Union Pacific relocation job north of the McNary Dam site, Cardon & Cox—subcontracting for Utah Construction Co.—have an International TD-24 shuttling back and forth from one end of their section of the project to the other, doing the hardest jobs wherever they may be.

TD-24 operator Wilbur Strootman says, "We take all the tough assignments, and do them faster and better than any other tractor on the job. This TD-24 is the best tractor I've ever been on. I really go for it."

Here are five big reasons why—five advantages that make the Big Red TD-24 the work champ of the world:

TD-24 Power—148 maximum drawbar horsepower, more than any other crawler on the market.

TD-24 Speed—8 forward speeds, 8 reverse. Moves loads faster, gets back faster for a faster work cycle.

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TD-24 Starting—Quick push-button starting in any weather.

Want to know more? Ask a friend who owns a TD-24. And ask your International Industrial Distributor both about the TD-24 and about his fast field service and complete shop facilities. You'll be a TD-24 man from then on in!

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POWER THAT PAYS

INTERNATIONAL POWER PAYS OFF ON THIS BIG RAILROAD RELOCATION PROJECT

Continued from page 27

are employed as cableway operators or cableway signalmen. Much responsibility rests on the shoulders of the men who fill these jobs. They are key men in a high-speed operation that keeps concrete moving from the mixing plant to the dam at an average rate of 7,600 cubic yards, or 30,400,000 pounds every 24 hours.

One of the best cableway operators on the job is Ralph Olson who is literally bolted to his job. A special steel joint, designed by Ralph, connects his artificial left arm with the cableway speed control. The special joint, which has a ball-bearing swivel to give it the smooth flexibility of a man's normal wrist, screws on to Ralph's artificial arm and bolts firmly to the speed control handle.

$2 Million Asked for Idaho Dam

A request for a $2 million supplemental appropriation to reactivate construction of the Palisades Dam and Power Plant on the Snake River in eastern Idaho was forwarded to Congress recently by President Truman. The request was on Secretary of the Interior Chapman's recommendation that work on the dam proceed at once because development of phosphate beds and the increased activity resulting from the atomic energy installation at Arco have sharply increased the power needs of the area.

Preliminary work on the Palisades Dam was started several years ago, but was suspended. If funds are forthcoming, excavation of the diversion tunnel can start in January.

The dam will be an earth-fill structure 260 feet high, creating a storage reservoir of 1,400,000 acre-feet capacity. Total cost of the project is presently estimated at $76,600,000.

Engineer Shortage Ups Virginia Road Costs

Shortage of engineering personnel has forced the Virginia State Highway Department to "farm out" surveys and designs for $40 million worth of bridge and highway construction in the last two years, it was recently revealed.

The figure did not include preliminary surveys, the largest of which is for the $42 million bridge-tunnel project between Norfolk and Newport News. Outside consultants' fees are double the cost of work done by the department's own engineers.

Starting pay at the Virginia Highway Department for a graduate engineer with a college degree is $294 a month. The deans of the state's three engineering schools had advised that at least $325 a month must be offered.

The department's design and drafting division normally has a complement of 215, but now it has less than 100, it was noted. During the past two years it has had to call on more than a dozen private firms for consultant work.

Develop New Method To Splice Belting

A new method of splicing steel cable conveyor belting, developed and patented by the B. F. Goodrich Co., Akron, O., places all cables under equal tension during vulcanization so that each cable carries its share of the load in the finished splice.

The new method also permits the straightest possible splice, resulting in belts that track straight and true for economical, trouble-free operation. Laboratory stress-strain tests prove that the splice is as strong as anywhere else in the belt.

To make the splice, cable ends are cut in staggered pattern. Small tubular connectors are placed over the butted ends. Connectors are first given a light crimping. The partially made splice is then stressed to even the lengths of the cables, and connectors are given a final crimping to lock them to the cables. Rubber and fabric removed for the splice is then rebuilt around the cables. The splice is cured under tension with a conventional vulcanizer.

The tensioned splice can be made in the field as well as at the factory. Only special tools needed are a crimping device for squeezing the connectors to anchor the cable ends, and a special scraping tool to remove rubber from the cables.

Steel cable belts are being used in-

Edmond A. Ragland

Edmond Urquhart Ragland, 60, secretary-treasurer and production manager of the Superior Stone Co. of Raleigh, N. C., died suddenly of a heart attack on October 7. He was born October 11, 1890 in Little Rock, Ark.

Mr. Ragland obtained C. E. degrees from Auburn and Cornell

Universities. He served as a major in C.A.C. during World War I and since that time has been engaged in the production of crushed stone mostly in the state of North Carolina. At the time of his death he was in charge of plants in Virginia, South Carolina, and Georgia as well as North Carolina with current annual production in excess of 5 million tons.

Mr. Ragland is survived by his wife and two daughters as well as a brother, Trent Ragland, president of Superior Stone Co.

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creasingly for heavy service where a high tension belt is required. Long conveyors or high lift conveyors often used in mines, quarries and large construction projects are typical installations.

Government Engineer Leaves for Liberia

Robert R. Williams, Bureau of Reclamation engineer has left for Monrovia, Liberia, on a one year Point Four assignment to investigate possible hydroelectric power development sites on the St. Paul River.

Williams' activities will be part of a public works project in a country-wide Point Four technical cooperation program to help implement Liberia's plan for economic development.

The hilly topography of Liberia and its numerous water courses afford many sites which are said to be well-suited for the development of hydroelectric power. The only installation of this kind now in operation was constructed by the Firestone Tire and Rubber Co. for the purpose of supplying its approximately 100,000 acre plantation at Harbel with power and light.

While in Liberia, Williams will serve as advisor to the Liberian Department of Public Works on hydroelectric power matters.

Williams holds a civil engineering degree from the Illinois Institute of Technology. From 1937 to 1948 he directed investigations for the Corps of Engineers in connection with military airports and flood control dams. Since 1948, he has been in charge of the Bureau of Reclamation Parker Dam power project at Phoenix, Ariz.

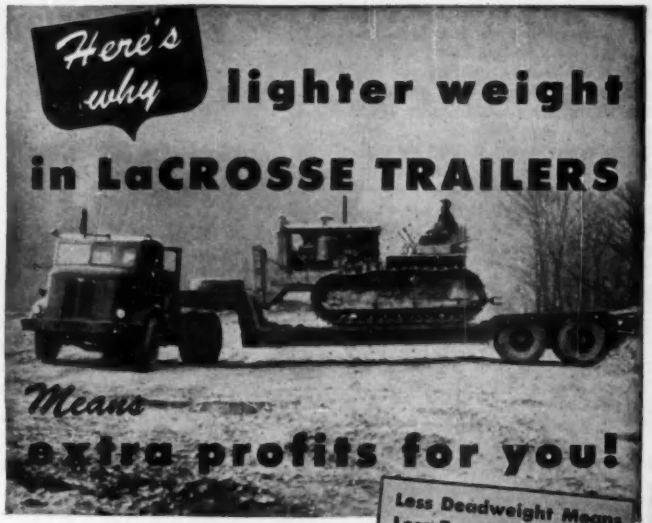
Moles Announce Awards

Stephen D. Bechtel and Charles B. Spencer will receive the Moles awards for 1952. The awards were recently announced by the Moles, a New York association of tunneling and heavy construction men. Considered the highest recognition for service to the American construction industry, the awards are given annually to one member of the Moles and to one non-member.

Winner of the non-member award, S. D. Bechtel, is president of The Bechtel Corp., San Francisco, a world-wide construction organization.

C. B. Spencer, the member award winner, is president of the engineering and construction firm of Spencer, White & Prentis, New York. Like the Bechtel firm, Spencer, White & Prentis works on a world-wide basis, primarily in the field of heavy and unusual foundations for structures.

Occasion for presentation of the awards will be the Moles award dinner, to be held at the Waldorf-Astoria



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Hotel, February 6, 1952. George Ferris, vice president and general manager of Raymond Concrete Pile Co., is chairman of the award committee.

A 1923 civil engineering graduate of the University of California, Bechtel served overseas with the U. S. Army Engineers in World War I. He started his construction career as a summertime employee of his father, president of W. A. Bechtel Co. He was director and member of the executive committee, Six Companies, during the construction of Hoover Dam. On the east crossing for the San Francisco Bay bridge his firm was a part of Bridge Builders, Inc., on pier construction.

The firm also was a part of Pacific Naval Air Base Constructors, which did pre-World War II defense construction on Wake, Midway, Guam, Johnston and the Hawaiian Islands.

During World War II Bechtel built numerous industrial plants, air bases and refineries, as well as a section of the "Big Inch" pipeline that fed oil from Texas to the east coast.

Bechtel directed construction of the Canol Pipeline, in Canada, as a partner in Bechtel-McCone, general contractors on the project. The firm engaged in military base construction in Arabia during World War II, and now is building pipelines there.

Born 64 years ago in New York City, Spencer was educated in New York public schools and entered Columbia University in 1903. In 1910 he emerged with two degrees—A.B. and C.E., and keys from two honorary societies, Sigma Xi and Tau Beta Pi. His graduation thesis, "Strength of Metals Under High Temperatures" was so timely, particularly to the growing automobile industry that it was published all over the world. Also he played on two of Columbia's championship teams—basketball and soccer.

Up to World War I, he worked at various jobs, railroading, tunneling, even architecture and finally, foundations and underpinning. Before leaving for France in World War I, he was given a special leave by the army to report on the settlement of the Cotton Exchange into New Orleans mud.

Returning from Europe after World War I, he joined E. A. Prentis and Lazarus White in forming Spencer, White & Prentis, which is still going strong after 32 years and a thousand contracts all over the world. Harbor work in Persia, airports in the Bahamas, a bridge in Cuba, dry docks, tunnels, four sections of the New York subway system, building 100 tankers in Mobile, locks and dams on the Mississippi River, and foundations and underpinning jobs in many places. His latest triumph is the underpinning of the White House.

He served two terms as president of the General Contractors Association and during that time was active in the revision of the New York City building code, a job he had done before in 1916 and again in 1936.

● Shown at work rerouting route 9 between Northampton and Pittsfield, Mass., is a Bucyrus-Erie ¾-yd. 22-B dragshovel. The job is to straighten approximately 4½ miles of dangerous twisting road by removing ledges, filling, and building bridges and highway supports along the riverway. Most of the work is being done in rock.

Paving Bids Being Taken On Oklahoma Turnpike

The Oklahoma Turnpike Authority is speeding plans to have all of the 88-mile 4-lane road under paving contract before the first of 1952. This is about two years from the time the first construction began on the $31 million Oklahoma City-Tulsa road.

Bids will be taken on two types of surfacing: Portland cement and asphaltic concrete. Specifications will be sufficient to carry more than the maximum 28,800 pound axle load authority engineers claim necessary.

Cement bids will be on an 8-inch surface with a 4-inch sand cushion and a 9-inch surface with a 3-inch sand cushion. There will be three alternates on asphaltic concrete paving, 5-inch surface on a 7-inch crushed rock base, 6-inch on a 6-inch crushed rock base and 8-inches on a 4-inch crushed rock base.

California Dam Contract Let

A Bureau of Reclamation contract for the construction of Glen Anne Dam on the Cachuma Project near Santa Barbara, Calif., has been awarded to L. A. and R. S. Crow, of El Monte, Calif., on the low bid of $733,740.50.

The earth-fill dam 250 feet long and 102 feet high will provide a regulating reservoir for Santa Ynez River water to be brought from Cachuma Dam and Reservoir through the 6.4 mile Tecolote Tunnel. It will be distributed by a 28-mile south coast conduit to 29,650 acres of farm land in the vicinity of Santa Barbara and furnish an ultimate minimum of 10,300 acre-feet of water per year for the city of Santa Barbara. Use of water in Santa Barbara equals or exceeds the estimated safe yield of the recently enlarged Gibralta Reservoir, and the supply obtained from underground storage pointing up the need for Glen Anne Dam.

Under the terms of the contract, work on the Glen Anne Dam to be located on the west fork of Glen Anne Creek 6 miles from Goleta, Calif., must be begun within 30 days and completed

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in 400 calendar days. Work schedules of the bureau contemplate that the project will be placed in operation early in the 1953 fiscal year.

The total cost of the project is estimated at $31,520,000. This includes the 216-foot Cachuma Dam, key structure on the Santa Ynez River providing storage capacity for 270,000 acre-feet of water.

ASCE Convention Discusses Permafrost

Because of the importance of arctic engineering, members of the American Society of Civil Engineers at the annual convention in New York recently listened to more than a dozen experts relate the effects of arctic cold on engineering structures and their experiences with it.

Permanently frozen surface materials of the earth, such as muck, sand, gravel and ice complicate design and construction of dams, building roads, landing strips and other structures. Permafrost exists over all of northern Alaska, lying in continuous strata or in sheets, and lenses separated by permanently thawed material.

One of the experts, G. W. Rathjens, consulting engineer of Berkeley, Calif., has had a decade of experience with engineering structures in Alaska. "In the solution of any design or construction problem in a permafrost area," he told the civil engineers, "one of the first decisions which the engineer must make is whether to disturb the permafrost or to arrange construction so that it will not be disturbed." In explaining this, he stated that "to upset the equilibrium which nature has established is a very serious matter." A careful study of all existing factors is required before a forecast can be made of the effect of disturbing this natural equilibrium.

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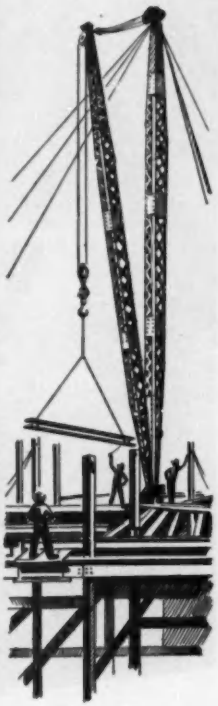
When **PRODUCTION** *hangs by a "Thread"*



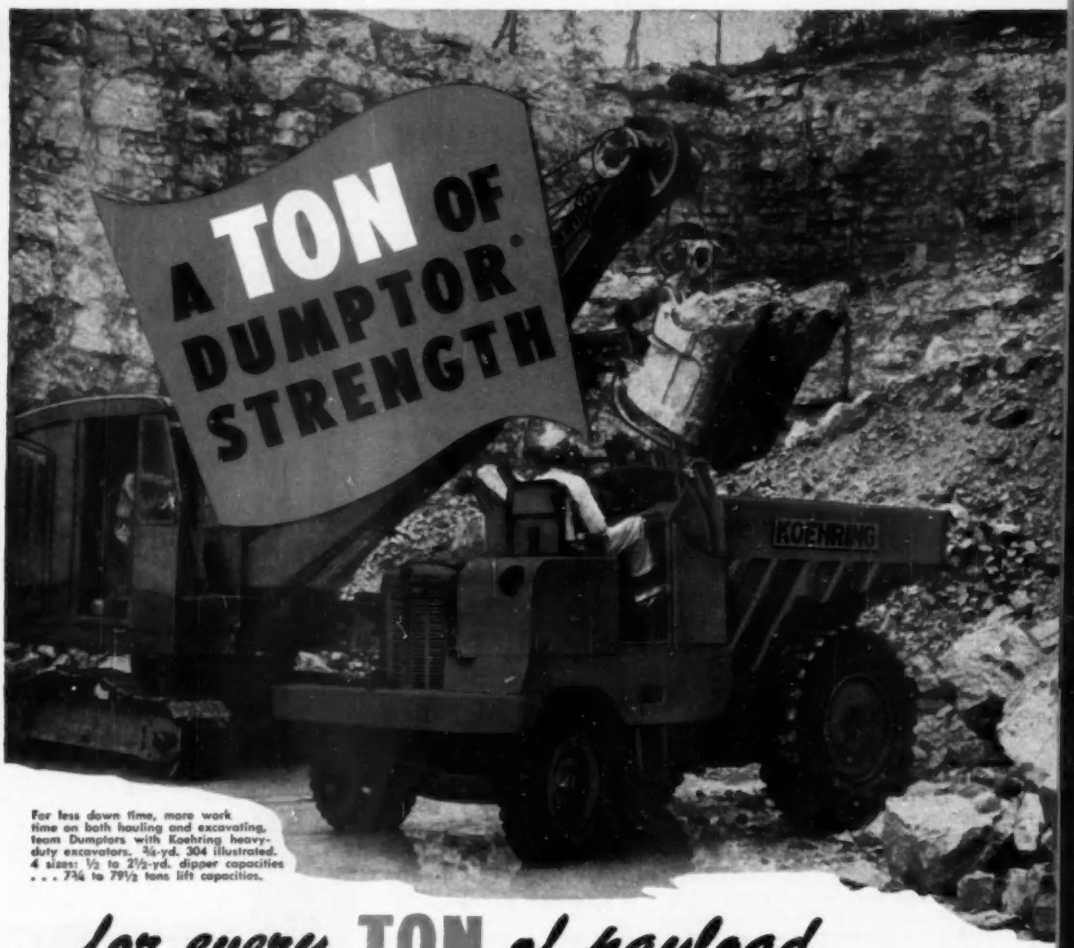
specify the wire rope that gives the greatest service. "HERCULES" (Red-Strand) *Preformed* spools more evenly—bends more smoothly. Handles more safely. Splices more easily. Far fewer replacements are needed.

Engineered to reduce internal tension and twisting, "HERCULES" (Red-Strand) *Preformed* stays on the job—*in* the groove.

For uninterrupted production, there is only one right rope . . . be sure to select the correct size and type.

Feel free to consult our Engineering Department at any time for specific recommendations. A. LESCHEN & SONS ROPE CO., 5909 Kennerly Ave., St. Louis, Missouri. Warehouses and branch offices in all principal cities.

LESCHEN WIRE ROPE



For less down time, more work time on both hauling and excavating, team Dumptors with Koehring heavy-duty excavators. ¾-yd. 304 illustrated. 4 sizes: ½ to 2½-yd. dipper capacities . . . 7¾ to 79½ tons lift capacities.

. . . for every TON of payload

Dumptors stand up under the severest shocks of shovel-loading 1½ to 2½ yards of rock at a pass because they're built extra tough for rock handling. There's more than a ton of net vehicle weight for every ton of payload.

All-welded body, sides, ends and bottom are heavily reinforced with 4" channel ribs. More than triple strength has been built into the bottom . . . seasoned 1⅝" oak timbers are securely bolted between two layers of 5/16" steel plate. Steel-oak-steel construction cushions shocks of rock loading. Free-swinging, kick-out pan adds another tough 3/16" high-manganese steel plate for extra protection. Dumptor also has: rugged main frame, 8" ship-channels, heavily trussed . . . one-piece steel drive-axle housing and transmission case . . . 4" chrome steel drive axles . . . cast alloy steel "I" beam steering axle. All add extra strength to Dumptor chassis.

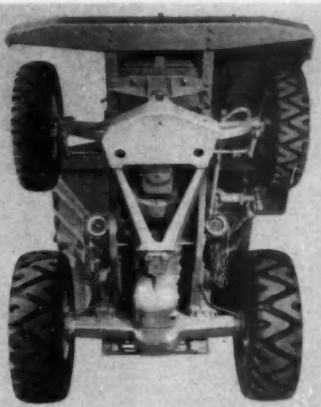
Heavy-duty construction like this assures you that Koehring 6-yard Dumptors will stand up under your toughest assignments . . . that there will be little down time with Dumptors on your job. For complete facts, see your Koehring distributor today.

CE122

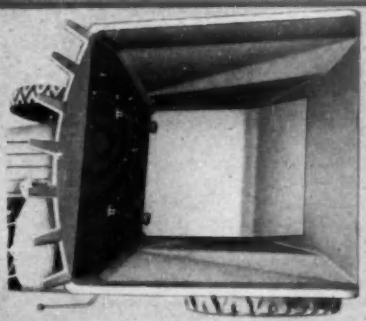
KOEHRING HEAVY DUTY

KOEHRING DUMPTOR®

KOEHRING COMPANY, MILWAUKEE 16, WIS. • SUBSIDIARIES: • KWIK-MIX • PARSONS • JOHNSON



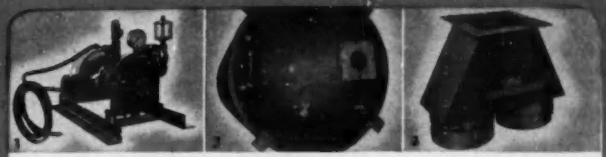
NO "SOFT SPOT" on Dumpter's underside . . . 1-piece, cast steel housing protects drive axle and enclosed chain drive. Wishbone supports the skid plate . . . shields the radius rod and the engine crank case . . . and supports the oscillating steering axle.



KICK-OUT PAN adds an extra 3/16" high-manganese steel plate on top of sturdy Dumpter bottom . . . breaks suction of sticky materials for fast, clean dump. Big 8' x 8' top gives easy-to-hit target for fast loading over the side or end . . . with less spillage.

1-SECOND GRAVITY DUMP . . . no slow-acting body hoists . . . no body-hoist maintenance . . . plus some speeds forward and reverse for no-turn shuttle hauling keep production yardage high, costs low with Dumpters.

INCREASE BATCH PLANT PROFITS *with Johnson accessories*



Rotary Vane Compressor gives 7 cu. ft. air pressure per min. cement aeration. 15-lb.-limit relief valve.

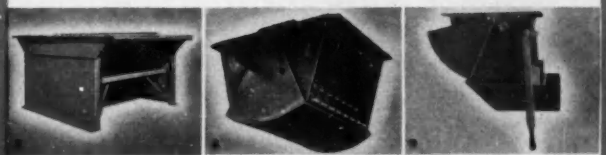
Aeration Fittings properly spaced in Johnson bins and silos keep cement free flowing.

2-Way Elevator Discharge Valve, a flop-type chute, directs flow of cement to the storage tank.

Pivoted Distributor feeds aggregates to bin sections. Positions and locks by ground control wheel.

Bin Signals accurately register high and low levels in cement or aggregate. Dust-proof.

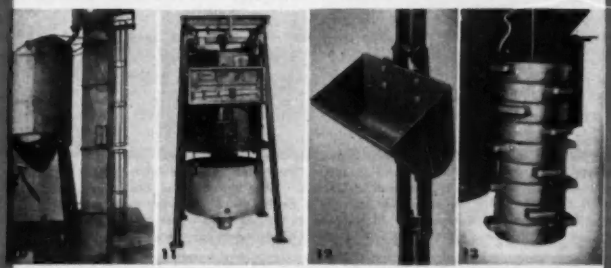
Rotary Plug Valve accurately controls cement flow. Plug operates freely in self-aligning bearings.



Receiving Hopper 30 and 50-bbl. sizes, feeds bulk cement to elevator. All-welded, weather-proof.

Aggregate Fill Valves single clam, radial type for jam-proof closing. Hydraulic pressure lubrication.

Tunnel Gate for stockpile reclamation. Single radial clam. Skirt board is hinged, opens and locks securely.



Safety Cage of 28" steel, welded to casing, can be furnished with all Johnson elevators.

Water Weigh Batchers, semi- or full-automatic types. 120 and 240-gal. sizes available.

Elevator Buckets in many sizes for aggregates, and cement. **Steel Chain** has carburized knuckles.

Batcher Test Weights in sets of nine, 50-lb. calibrated units, and two 25-lb. steel hangers.

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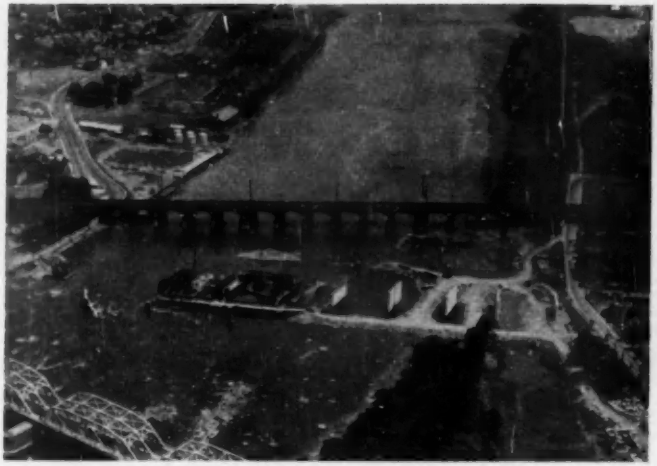
Continued from page 33

To illustrate Rathjens cited his experience with the construction of a 6500 kva steam power plant near Fairbanks in 1926. "The site selected appeared after exploratory drilling to be thawed gravels. As excavation progressed it developed that only a portion of the gravels were thawed and the site was over a very large kidney of dry permafrost. Water was moving in the gravels past the kidney but the closely packed material in the kidney itself was dry.

Original plans called for a foundation of piles to be driven into the thawed gravels above the kidney and into the frozen sands and gravels of the kidney itself. However, a careful investigation convinced the engineers that the foundation should be redesigned to eliminate the piling and to support the structure on thawed sand and gravel which would distribute the load to the kidney itself.

Heat to thaw a portion of the dry permafrost was supplied from two locomotives to pipes covering the extent and depth of the area—100 feet greater in each horizontal direction than the size of the proposed structure and to a depth 30 feet below the footings of the proposed structure. In this manner the thawed sands and gravels were confined by permanently frozen materials.

For over 20 years the power plant has been in satisfactory operation with no indication of foundation trouble. "Had piling been driven or explosives used in this excavation as they are ordinarily used in the temperate zone," Rathjens concluded, "the permafrost kidney might have been so disturbed that live ground water would have moved into and through the fractured zones and caused unwelcome thawing accompanied by continuous dangerous settlement."



• Foundation piers and abutments which will carry the new express feeder highway for the Trenton Freeway across the Delaware River between Morrisville, Pa., and Trenton, N. J., are shown in this aerial view. The existing Pennsylvania Railroad bridge is just beyond the construction work and the present local traffic highway bridge below it. New river piers are being built inside sheet steel pile cofferdams by Dravo Corp., Pittsburgh, general contractor for the $2,136,298 structure. All piers will be faced with granite. The superstructure will be erected by American Bridge Co.

Plan Start of $12 Million Dam

Contracts for the construction of a $12 million dam for a new Columbus, Ohio, city reservoir could be let by next June, with the reservoir to be ready for use early in 1955, according to a report by Burgess & Niple, civil and sanitary engineering firm preparing the plans.

To be known as Hoover Dam, the project will be constructed on Big Walnut Creek. According to the engineers' report, the dam will flood 3,600 acres with 25½ billion gallons of water. It will assure an average daily supply of 47½ million gallons, slightly less than the present average daily usage at Columbus.

The dam will be 3,000 feet long, including a spillway section 680 feet long. About 300,000 yards of concrete will be poured into the structure. Half a million yards of earth will be required for the embankment adjacent to the spillway.

Although setting a revised figure of $12 million as the cost of the dam, including road relocations, clearing, grubbing and land costs, the engineers warned that construction costs "are changing from day to day."

Hoover Dam will be the city's third such reservoir, and bigger than the present Griggs and O'Shaughnessy Dams combined.

• This Blaw-Knox "package" of road-building equipment is used in the paving of the western extension of the Pennsylvania Turnpike. The Patterson Construction Co. of Monongahela, Pa., is paving a vital link of 3.9 miles near Harmarville. Blaw-Knox equipment being used by the contractor includes a Foote 34-E dual drum paver, a spreader, finishing machine and road forms. The contractor reports being able to pave an average of 200 or more lineal feet per hour when conditions are satisfactory.

Retard Grass Growth With New Chemical

A new chemical, known as maleic hydrazide, slows the growth of grass and may slash millions of dollars annually from the cost of mowing the roadsides and center islands of local, state and national highways.

The unique property of the chemical was revealed by one of its developers, Dr. John W. Zukel, a scientist with the Naugatuck Chemical division, United States Rubber Co.

For the past year, Dr. Zukel, in co-

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Big, dependable yardages are "standard equipment" for Bucyrus-Erie excavators, as owners and operators the world over will testify. The superior performance records of Bucyrus-Erie result from fast, smooth operating cycles and on-the-job reliability for peak output every shift . . . *plus* the extra values of soundly engineered design and durable construction available only to Bucyrus-Erie as a result of its unmatched experience in the construction of quality excavating machinery.

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BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

● Here is visual proof that even termites look forward with consuming interest to their monthly copy of *Excavating Engineer*. The termite tidbit is explained more fully in the letter below which accompanied it.

THE PANAMA CANAL
CANAL ZONE
Civil Affairs Bureau

CABLE ADDRESS
"PANCANAL, PANAMA"

Balboa Heights, C. Z.
June 12, 1951.

Excavating Engineer Publishing Co.
South Milwaukee
Wisconsin

Attention: Editor, Excavating Engineer

Gentlemen:

We all know that there is a certain amount of superficiality to the articles that editors put or allow to be put into their magazines and that man in his limited state never has been or ever will be able to really penetrate to the heart of and consume entirely the product of the editorial mind and method. But if man can not, the termite can, and I am sending you tangible proof of the erudition and discrimination of the brand of Isoptera that we have here on the Canal Zone and how the complete consummation and assimilation of a subject has been accomplished by him. In our files, he passed up the arts and science, the fictions, the fashions and the philosophies and made a mole line to the Excavating Engineer with the result that you see.

We have long since had evidence that these little devils eat their way through standard lead cable to listen to our telephone conversations, but this is the first evidence that has come to my attention to show that they are reading what we are doing as well. For the time being, we have put the 1947 Sea Level Canal Study under seal and steel, but when and if the project is ready to go, we'll open up, let the termites in and then sit back and watch the dirt fly.

I am sealing the package rather securely so that it won't shift, but you must take off the scotch tape and investigate below the surface if you want to appreciate the extent of the research. I am sure the bugs themselves are long gone so you needn't worry about them getting loose in your own storage and filing facilities.

Very truly yours,

R. SEEES,
Civil Affairs Director.

Enc.:
Copies Excavating Engineer.

operation with the Connecticut State Highway Department, has been conducting a series of experiments along the Wilbur Cross and Merritt Parkways to determine the effectiveness of the chemical for retarding the growth of grass along highways.

The objective of the experiments was to reduce the number of mowings needed to keep the landscaped areas in proper trim.

A total of 55 different plots comprising 74 acres were sprayed with maleic hydrazide between August 1950 and October 1951.

Most promising results were obtained on 12 one-acre plots in the center islands which were sprayed once with the chemical at the rate of 2 pounds per acre last May 2 and 3. The growth of lawn grasses in these test strips was slowed to a point where only two mowings were needed throughout the spring and summer. Adjacent untreated sections had to be mowed 19 times during the season.

The cost of spraying the center island test plots was approximately $10.00 per acre. Based on the total labor and equipment costs for mowing the adjacent untreated sections, maleic hydrazide saved approximately $70.00 per acre for the season. The grass in the sprayed plots was equal in appearance to the mowed sections.

Tests also found that maleic hydrazide could be formulated with 2,4-D weed killer so that one spraying would also kill off weeds such as wild carrot and plantain.

It is pointed out that it is too early to draw any overall conclusions, although results of this year's experiments have been highly gratifying.

Anti-Pollution Program Advances in NYC

Marking another step in New York City's program to free its surrounding waters of pollution, construction has started on a $2,500,000 Port Richmond sewage treatment plant in Staten Island.

The new plant will be one of two to be constructed on Staten Island as part of the $106 million program designed to free the city's beaches and other recreational waters from pollution by 1953. That program, in turn, is part of the $300 million program to abolish pollution in all waters surrounding the city by the end of 1959.

Located on Kill Van Kull, the Port Richmond disposal plant will serve the entire northerly section of Staten Island. It will have a capacity of 10 million gallons a day and will ultimately be enlarged to a daily capacity of 30 million gallons. The next Staten Island sewage disposal plant to be

constructed will be the Oakwood Beach plant with a daily capacity of 15 million gallons.

New York City's $106 million program calls for seven modern plants with a combined daily capacity of 400 million gallons. One plant is in operation, five are under construction and designs for two others are nearly completed.

Convert Chicago Swamp To Valuable Land

A 1,800 acre swamp on Chicago's far southeast side is being converted into valuable industrial property by the Industrial Cinder Co., a Chicago firm that fills the watery wasteland with slag and refuse from the Republic and Wisconsin steel mills.

The steel mills hired the Industrial Cinder Co., to handle waste products in 1943 and for four years the company operated with rental equipment. Seeking to increase the efficiency of its operation, the company started purchasing its own equipment late in 1946 and found that production increased 40% and operating costs dropped.

Currently, the disposal company is operating three International TD-18's with dozers and an International TD-14A with front end loader in addition to a fleet of nine International trucks, three Link Belt shovels and a Link Belt dragline. With this equipment Industrial Cinder moves 60,000 tons of slag yearly from the mills to the dump where the dozer tractors move the abrasive material into the swamp.

• Truckloads of slag brought to the dumping ground from the Republic and Wisconsin Steel mills are pushed into the swamp by this International TD-18A and Bucyrus-Erie dozer. Part of the reclaimed land is visible in the background.

E. J. Lusk, Industrial Cinder Co. official, said: "The slag is so sharp that our truck tires start being shredded to ribbons after 2,000 miles. Our trac-

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• Double-hinge construction on Wellman's multiple-rope bucket permits faster opening than a single hinge. This speeds up operations, also gives a bigger spread in the open bucket for the same headroom.

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Your job is the starting point for Bucyrus-Erie engineers. They analyze the character and depth of the deposit, water supply, power and transport facilities, and other conditions peculiar to a specific operation. Balancing these factors with experience unique in the industry, they produce a dredge design geared to high output at lowest possible cost.

But that's not all. Bucyrus-Erie's complete manufacturing facilities provide on-the-spot control of *all* stages of production. That means real assurance of quality in materials and workmanship to match the top-notch *years ahead* design.

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tors doze this abrasive material that weighs as much as 3,300 pounds per cubic yard, and we keep going six days a week the year around."

Based on tonnage of slag handled annually, Lusk estimates his company will be able to dispose of mill waste products in the present dumping area for the next ten years. Since the acreage being reclaimed is in the very heart of Chicago's southeast industrial section, much of the land is expected to be utilized for industrial expansion by the end of that period.

Director Named for Highway Research Board

Fred Burggraf, formerly associate director, was recently named director of the Highway Research Board, succeeding the late Roy W. Crum. Burggraf, who has been acting director since Crum's death last spring, has been associated with the board for fifteen years.

During four years with the structural materials division of the Bureau of Standards he conducted research investigations on the expansive behavior of unsound cements. The next eight years were spent with the Illinois Division of Highways as research engineer. He first joined the board in 1928 and spent four years as research engineer.

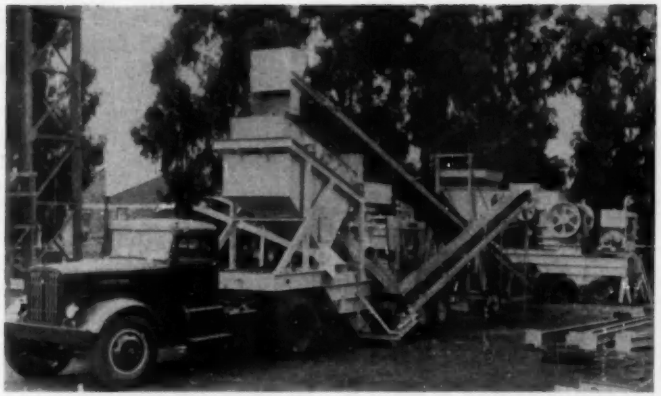
A member of the American Society of Civil Engineers, the American Concrete Institute, and the American Society for Testing Materials, Director Burggraf is active on a number of important committees and has contributed numerous papers on highway research problems. He has also contributed to regional state highway associations, the American Road Builders' Association, and several state engineering societies.

Alaskan Resource Report Sent to Congress

The "blue print" for Alaskan resource development, which has been reviewed by the Departments of Agriculture and Commerce, the Bureau of the Budget and other federal agencies, was submitted with the approval of the President for the information of the House and Senate, without specific recommendations for legislative or fiscal action on any details of the broadscale program.

The Alaskan investigations were begun by direction of the Congress which provided $150,000 in the 1949 Interior Appropriation Act for engineering and economic studies under the supervision of the Bureau of Reclamation, Commissioner Michael W. Straus said. Full cooperation was rendered by other federal and local agencies in the investigations, he added, including the Alaska Native Service, the Alaska Railroad, the Alaska Road Commission, the Bureau of Land Management, Bureau of Mines, Fish and Wildlife Service, Geological Survey, and National Park Service in the Department of the Interior, and the United States Departments of Agriculture and Commerce.

The general pattern of the develop-



• This mobile crushing plant was designed and manufactured by W. S. Thomas & Taylor, Ltd., Johannesburg, South Africa. The unit has a feed hopper with a grizzley 36x15 inches roller bearing jaw crusher powered by a 150 hp model HP-601 Cummins Diesel. The 25t gyratory crusher with a 10x4 foot x 2 deck vibrating screen and retractable and portable conveyors is powered by a 200 hp model HPS-601 Cummins Diesel.

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ment of our great West with federal assistance points the way by which Alaska can be developed, not at the expense of other portions of the country, but by the returns from Alaska itself. Not only does the country need Alaska's development from the standpoint of an expanding economy but the individual people need settlement opportunities, places to make their homes, business opportunities, and all the other benefits that are associated with a frontier country.

Some vital minerals occur in Alaska in substantial or significant quantities. Deposits of mercury, chromite, platinum, tin, tungsten, zinc, and antimony might, under more favorable economic conditions, or through the continued development of greater reserves, make welcome contributions to American industrial requirements. There are possibilities for significant discoveries of oil and the territory contains deposits of building and construction materials to meet many of its own growing needs.

Present aluminum production is severely restricted owing to lack of low-cost power in the states. Most light metal producers are combing the country for potential power sources which could be developed to supply energy at less than three mills per kilowatt-hour. There are only a few remaining undeveloped sites in the United States capable of generating energy at such low cost. This has resulted in light metal producers turning toward Canada. Recently, they have been eyeing Alaska's power potentialities. Alaska river systems could produce about 50 billion kilowatt-hours of energy a year.

Briefly summarized, five major conclusions for the consideration of the Congress in mapping Alaska's economic future are:

1. The demand for electric power supply in the territory is expanding so rapidly that new installations of hydroelectric power plants are needed.

2. Adequate agricultural production is necessary to the economic life and future development of Alaska.

3. Municipal and industrial water supplies are urgently needed in some localities.

4. Flood control and navigation of inland waterways in Alaska will increase in importance as the territory is developed.

5. Annual appropriations should be made to permit an efficient investigation of Alaska's land and water resources at a rate commensurate with the needs.

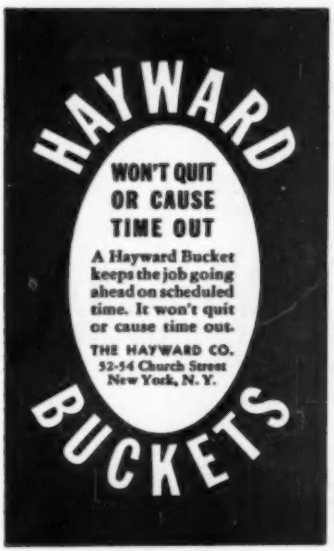
Henry H. Erkelenz

Henry H. Erkelenz, 72, retired vice president and member of the executive committee of Harnischfeger Corp., died October 6 in a Milwaukee hospital after a short illness.

Mr. Erkelenz was active in Harnischfeger management until his retirement two years ago. Born and educated in Germany, Henry Erkelenz left there in 1903 to go to Scotland and England as an electrical engineer. Eight years later he joined the engineering department of the Harnischfeger Corp., in Milwaukee, in February 1911. In 1925 he was made works manager, and in 1937 Harnischfeger made him an executive engineer and member of the executive committee. In 1943, Mr. Erkelenz was elected vice president in charge of engineering.

Henry Erkelenz had wide and varied interests. A 32nd degree Mason, he was a member of Excelsior Lodge No. 175, the Commandery and Tripoli Shrine. He also was a member of the Technische Verein, the Engineering Society of Milwaukee, the Milwaukee Association of Commerce, and the Army Ordnance Association and the Navy League. He was a director of the American Foundry Association, Milwaukee chapter, and had an active interest in the Boy Scouts of America.

Surviving are his wife, Emma, and a son, Eugene, of Milwaukee.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Date Set for British Exhibition

The third Mechanical Handling Exhibition and Convention to be organized in Great Britain will be held at Olympia, London, from June 4 to 14, 1952.

The exhibition will occupy about 250,000 square feet and will be the largest of its kind in the world.

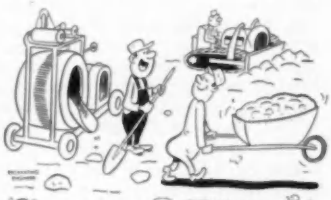
There will be about 200 exhibitors of trucks, cranes, aerial ropeways, overhead cranes, belt conveyors, elevators, truck dumpers, winches, power units, chains, gears, controls and other accessories.

About 12 papers by leading specialists will be read during the convention and the Institution of Production Engineers is to have an all-day session on Saturday, June 7. The complete program will be available later.

Hydroelectric Power Sets Record Peak

Nearly one and one-half billion kilowatt-hours of electric energy was added to the defense strength of the nation by hydroelectric power in 1951. The total output of more than 21 billion kilowatt-hours for the year was the largest since the inception of the Federal Reclamation program a half century ago and returned more than $35 million dollars to the Federal Treasury. In addition to repaying all the cost of power developments, revenues from Reclamation power plants bear costs of irrigation project developments.

Installed generating capacity of plants under the program was increased nearly one-fourth during the



"What'd I tell you? Isn't it a lot lighter when I add yeast?"

• R. S. Wilson, Goodyear Tire & Rubber Co. vice president (left), and Guy James, head of the Guy H. James Construction Co., prime contractors at Oahe Dam, discuss performance of the big Goodyear tires on the Euclid dump truck shown at work at Oahe. The two men met during a recent visit to the damsite by a group of Goodyear's leading sales executives who wished to observe the important project at close range. While in South Dakota the rubber executives also inspected the Ft. Randall damsite at Pickstown.

year to provide an additional 750,000 kilowatts of hydroelectric energy. The Federal Reclamation program made available 3,939,500 kilowatts of installed capacity in the 1951 fiscal year, a 23.9% increase over the 3,168,400 kilowatts of the previous year.

The 21,265,358,201 kilowatt-hours of electric energy supplied by the Bureau of Reclamation was a 7.4% increase over the 19,789,703,649 kilowatt-hours provided in 1950.

Including power plants constructed and operated by water users, plants under construction by the Corps of Engineers, and plants authorized to be constructed, a combined installed capacity of 7,544,077 kilowatts of hydroelectric energy ultimately will be made available.

Public Works Congress Elects Officers

Edward J. Cleary, executive director and chief engineer of the Ohio River Valley Sanitation Commission, Cincinnati, was named president of the American Public Works Association at its annual business meeting recently in Detroit's Veterans' Memorial Building.

As president of the national organization of public works officials, Cleary succeeds Milton Rosen, commissioner of public works, St. Paul, Minn., who remains on the board of directors of the association as immediate past-president.

Newly-named area vice presidents of the association for two-year terms are Allan H. Rogers, superintendent of public works, Garden City, N. Y., for the eastern region and Milton Offner, secretary, Board of Public Works, Los Angeles, Calif., for the western area. Holdover vice presidents for the central and southern areas are George R. Thompson, city engineer, Detroit, and Warren A. Coolidge, director of public works, Nashville, Tenn.

J. J. Dean, construction superintendent, Albany, Ga., was named for a two-year post as director of the association. Re-elected as director was Sol Ellenson, director of public works, Newport News, Va. Continuing members of the board of directors are Ralph C. Graham, superintendent, Construction and Public Works, Davenport, Iowa, and Ralph C. Taylor, superintendent, waste collection division, Cincinnati, Ohio.

Edward P. Decher, secretary and purchasing agent, Joint Sewer Commission, Newark, N. J., was elected treasurer.

Veteran Engineer Resigns Post

Edward E. Reed, pioneer of New Jersey roadbuilding, with 42 years of state service recently resigned. In 1909, he was appointed as assistant supervisor in the New Jersey Department of Public Roads.

Entrance into the larger field of service followed work in the Trenton Engineer's Office and with the Mercer County Engineer.

When he began his career with the

Dewatering 1500′ of 8′ x 14′ deep sewer trench at a river crossing, this 4″ Jaeger pump handled 40,000 gph at average speed of only 1200 rpm (10% to 15% lower speed than other pumps), and reprimed quickly, as needed, at 1400 rpm (compared with 1800 to 2000 rpm required to prime ordinary pumps). This is typical performance. Jaeger's larger shells and impellers, double priming action and use of largest engines applicable mean high efficiency, fuel economy, long life — in 1½″ to 10″ pumps.

See your Jaeger distributor or send for Catalog P-10

THE JAEGER MACHINE COMPANY 553 Dublin Avenue, Columbus 16, Ohio

COMPRESSORS • MIXERS • HOISTS • TOWERS • PAVING MACHINERY

state there was no state highway system. State aid of approximately $500,000 was apportioned for short sections of construction in various parts of the 21 counties. This year approximately $300 million worth of highways are under construction.

Mammoth Concrete Mixer Helps Build New Plant

A concrete mixer capable of mixing 168 cubic feet of concrete in one batch is now helping build the $400 million U. S. Steel Corporation's new plant at Morrisville, Pa.

The largest drum type mixer ever manufactured, it was made for the Warner Corp., of Philadelphia, Pa., by the Worthington Pump and Machinery Corp. It is capable of filling a 6½ cubic yard Hi-up truck-mounted agitator to capacity with a single batch. Three additional mixers of this type have been ordered.

Appoint New I-A Safety Council Director

W. T. Rogers, safety consultant, Ebasco Services, Inc., has been made managing director of the Inter-American Safety Council which was formed in 1938 to parallel in Latin America the work of the National Safety Council in the United States. Inter-American Safety Council's membership is comprised of over 200 companies of all types.

Through its headquarters in New York, the Safety Council serves as an Inter-American clearing house to gather and distribute information about causes of accidents and ways to prevent them and through contact with the members and constant research of its own staff and from many other sources is enabled to conduct a continuous and unified program of accident prevention. Information is disseminated through publications such as magazines, pamphlets, booklets, posters and other employer and employee educational materials.

Inter-American Safety Council is also affiliated with the Safety Committees of Santiago, Chile; Barranquilla, Colombia; Bogota, Colombia; San Jose, Costa Rica; Guatemala City, Guatemala; Panama City, Panama and Lima, Peru.

• When flood tides receded from the Kansas City, Mo., area all types of tractor equipment turned from more familiar jobs to cleaning up debris left by the flood. Here an International TD-14 equipped with a Bucyrus-Erie hydraulic bulldozer cleans up the Couch Tractor & Equipment Co. yard in Kansas City.

• Cleaning up after the disastrous flood in Kansas-Missouri area will go on for many months and losses were great. In Kansas, railroad rolling stock lost to service amounted to approximately 22,100 cars. A Caterpillar D7 bulldozer is shown here assisting clean-up job at Rock Island switch yards in Kansas City, Kans.

Tractor Equipment Helps Clear Flood Damage

Flood damage in the Missouri River and Kansas River basins in the Kansas City area, meant emergency shipment of men and machines to aid the stricken area.

The main part of the flood hit the city's central industrial area on Friday, July 13, covering the area with water which rose to a depth of 16 feet. It wasn't until the latter part of the following week that people were able to wade back into the damaged buildings.

As the billion dollar flood receded, it left ruined homes, factories and stores in its wake. Railroad cars were off their tracks, lying on their sides or smashed beyond repair.

Over the area covered by the water was a 10-in. coating of mud and debris.

In order to get the industrial area back into operation at an early date, hundreds of tractors and graders were needed. Truckloads of crawler tractors and motor graders were made available to the disaster area in emergency shipments.

Crawler tractors with front mounted shovels and bulldozers were seen at work all through the disaster area. Railroads were using them to clear their tracks. They could be seen in front of truck transport companies and merchandise buildings in the flood area lifting debris into trucks.

Economical Repair Method Saves Crankcases and Dollars

A method of repairing crankcases, which once were junked when bearing bores were scored during abusive operation, has been developed by the Autocar Co., heavy-duty truck manufacturers of Ardmore, Pa.

The process now used by service departments of the company's factory

branches across the country, promises to save truck operators thousands of dollars. Almost 100% salvage success is reported so far.

The secret is to resurface the scored cast iron of the bore with nickel alloy weld metal, the International Nickel Company's Ni-Rod or Ni-Rod "55" electrodes, and then machine down to the original dimension.

Seek Uranium With R.R.-Owned Geiger Counter

The Chicago & North Western Railway now has a geiger counter added to its rolling stock to be used as an aid in the never ending development of essential materials. A geiger counter will pick up radio-active impulses and transform them into audio waves.

The search is for radio-active ores, such as uranium, and will cover a 9-state area served by the North Western. Included in this area are the Dakotas, Illinois, Iowa, the upper peninsula of Michigan, Minnesota, Nebraska, Wisconsin and Wyoming.

Maine Voters Approve Bond Issue for Roads

A $27 million highway bond issue was approved by Maine voters at a recent referendum election.

Proceeds from the bond issue, together with federal aid and other state funds, will make available $98 million for the construction and reconstruction of 1,600 miles of roads and many bridges in the next seven years.

The bond issue will mark the abandonment of the long-used pay-as-you-go highway financing program in Maine.

Also approved by the Maine voters was a $2,500,000 bond issue for a second Penobscot River bridge between Bangor and Brewer.

"Here's a full day's pay — now go home!"

LOAD, HAUL and UNLOAD
MORE Heavy Equipment IN LESS TIME
... with the "Sensational"
ROGERS TYPE "TPG" Power Lift
DETACHABLE GOOSENECK

● Versatile performance features plus well known Rogers quality construction embodied in work tested design, puts the Type "TPG" Power Lift Detachable Gooseneck Trailer in a class by itself for an "all purpose" single unit.

If you contemplate the purchase of a new trailer, by all means investigate this increasingly popular model. Write for literature today.

Featuring 5 EXCLUSIVE ADVANTAGES

1. Carries heavier loads on larger tires.
2. Detaches quickly for fast, easy front loading.
3. Stoops to clear low overhead obstructions.
4. Raises its deck to clear high banked crossings.
5. Is detached, loaded and reattached in 5 minutes.

THE ROGERS Power Lift DETACHABLE GOOSENECK CAN BE OBTAINED ON ANY STANDARD ROGERS DROP DECK TRAILER

EXPERIENCE builds 'em ROGERS PERFORMANCE sells 'em

ROGERS BROS. CORP.
ALBION, PENNA.
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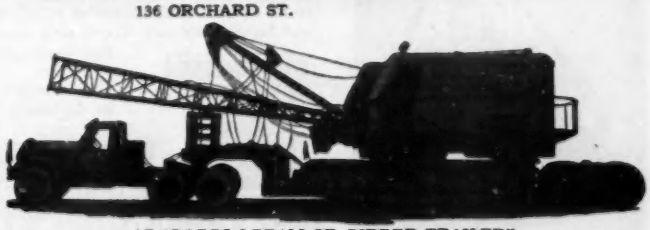
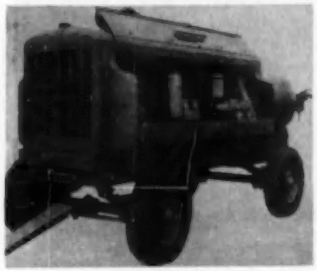


"RODGERS I BEAM OR GIRDER TRAILER"

Equipment

You Ought to Know About



Air Compressor

Manufacturer: Jaeger Machine Co., Columbus, O.

Claims: The new compressor, rated at 365 cfm at 100 psi utilizes a 165 hp Model HRBI-600 Cummins Diesel for its power plant. Engine operating speed of the Diesel-compressor unit is 1,240 rpm.

Both the engine and compressor are mounted on structurally welded main frames. The heavy duty wagon has an "autosteer" front axle, and can be hauled safely at 35 mph over rough roads. Steel wheels or skid mountings are also available.

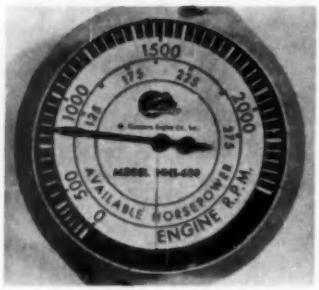
Length of the complete rubber tired unit is 12 feet, 3 inches; width—5 feet, 10½ inches; height—6 feet, 9 inches; and weight — 8,500 pounds. The 165 hp Model HRBI-600 Cummins Diesel is a 6-cylinder full Diesel, with a displacement of 743 cubic inches; a compression ratio of 15.5 to 1; a maximum rated rpm of 1,800; and a net weight of 2,365 pounds.

Tachometer Dial Face

Manufacturer: Cummins Engine Co., Inc., Columbus, Ind.

Claims: As a reminder to truck drivers that maximum horsepower is available only at the governed speed of the engine, a special tachometer dial face has been designed and copyrighted.

The new face design will show the



driver the approximate available horsepower as well as engine rpm at all times. Old design tachometer dial faces only showed an engine's rpm. This new tachometer dial face will help the driver and prevent engine lugging.

Lugging results when drivers continue to "pour on the fuel" when an overload condition causes the engine rpm to drop near the stalling point. To prevent this condition, the driver must shift to a lower gear allowing engine rpm to return to governed speed at which maximum horsepower of the engine will be available.

Maximum horsepower is never available when the engine rpm is pulled down by overload. Lugging causes valve and injection troubles which will prevent the engine from delivering its full horsepower until it is corrected.

New special tachometer dial faces for six different models—all for Stewart-Warner tachometers, are now available for Cummins Diesels.

Tamper-Backfiller-Side-Crane

Manufacturer: Cleveland Trencher Co., Cleveland, O.

Claims: Model 80 is a one-man-operated machine that tamps, backfills, lays pipe, unloads and handles pipe, sheathing, etc., and does light crane work. The machine is mounted on a crawler having 24 separate travel speeds, ranging from 1 fpm up to 2⅛ mph. It tamps and backfills as it travels.

The model 80 tamps while traveling either along the side of the trench or straddling it. The tamper delivers a

ERIE BUCKET CATALOG *Shows*

Gross Loads for 43 Standard 2-Line Buckets in 9 Materials

Write for a copy of Catalog 2L-2. Compare your present bucket performance to see if you are getting the most from your crane. Or send us size and make of crane and materials handled, giving present bucket output. We'll give you Erie's proved bucket performance for your crane.

Erie makes 4 standard types of 2-line buckets in 43 sizes.

ERIE
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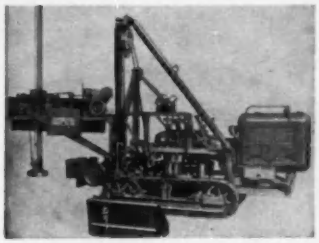
422 GEIST ROAD • ERIE, PENNSYLVANIA



380 ft.-lb. blow, 45 times each minute, compacting the earth in layers that are 3 to 4 times thicker than is practical by air or hand tamping. Because of its compacting ability, pavement may be relaid immediately without danger of settling.

The model 80's backfiller is a conventional drag-line type with a telescopic boom. Elimination of all excess weight permits use of the machine with complete safety over sidewalks and lawns. It backfills from either side of trench, from the side on which spoil bank is located or from the opposite side.

Light crane duties involved in trench operations are within the scope of the power-operated boom. Without extra counterweights, it will lift a weight of 6,000 pounds, located 3 feet from the edge of the crawler track. Standard boom sections are extendable to 15 feet. The model 80 is also available as a backfiller-side crane only, with provision made for the addition of the tamper unit at a later date.

Selector Cavity Resonator

Manufacturer: Motorola, Chicago 51, Ill.

Claims: Television interference caused by spurious and harmonic radiations of base station 2-way radio communications equipment can be eliminated by the addition of a Motorola precision selector cavity resonator.

These units minimize spurious and harmonic radiation from any transmitter antenna system and make it possible to use two or more transmitters on the same antenna without mutual interference.

A cavity resonator is effectively a very high "Q" circuit which can be inserted into a line, connecting the transmitters and receivers with the antenna.

Motorola cavities, designed for the 30-48 MC., 72-76 MC., 122-132 MC., and 132-180 MC. communications bands are temperature compensated for optimum performance over wide temperature ranges.

Mechanical design and element dimensions are proportioned for optimum impedance match and a low voltage standing wave ratio. Each unit has an input and output impedance of 50-72 ohms with a 250 watt power rating.

Rock-Type Tire

Manufacturer: B. F. Goodrich Co., Akron, O.

Claims: A new tire designed particularly for graders operating where there is considerable rock.

A need for this specialized tire exists because of the growing use of special tractors, graders and motor patrols in quarries and other types of service where cutting of the casing is a particular problem.

Continued on page 50

"Then I had to install this little gadget, sir — that was 73c — any other expenses the home office questions?"

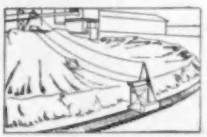
ONE OPERATOR... can DIG... HAUL... DUMP...

MORE YARDS with a

SAUERMAN Long Range MACHINE

Picture shows a 2 cu. yd. Sauerman Power Scraper with a 500 ft. operating span used by the Nevada Silica Sands, Inc., to mine sandstone. Because the material will not cave, the digging path of the scraper must be changed frequently, so the tail end is arranged for automatic rapid shifting.

Sauerman Scraper Excavator



Sauerman Scraper Stockpiler

Sauerman Slackline Cableway

"The best bet for big output and low upkeep on any dig-and-haul job," say users all over the world, "and Sauerman machines are simpler to operate, too."

Yes, Sauerman machines feature speedy, trouble-free action under the control of a single operator . . . move large yardages from any point within their cable radii. Sauerman machines will reach across a river, deep down into a pit, up to the top of a hill or across a wide stockpile — and handle a heaping load every time. Digging, hauling and dumping are accomplished in one continuous, rapid cycle.

Other desirable features of Sauerman Slackline Cableways and Power Drag Scrapers: First cost is surprisingly low . . . maintenance is negligible . . . unusual flexibility of the machines means they can be extended and adapted to suit changing requirements.

Sauerman Bros., Inc.

574 S. CLINTON ST., CHICAGO 7, ILL.

More Production... at LESS COST

EUCLID
THE PIONEER

PROVED on hundreds of off-the-highway construction and industrial jobs, and in open pit mines and quarries, "Eucs" have the capacity and speed to move more loads faster and at lower cost.

There is a Euclid model for every off-the-highway hauling requirement. Rear Dump "Eucs" of 10 to 34 ton capacity have travel speeds up to 36.3 m.p.h. and are powered by diesel engines of 125 to 400 h.p. Bottom-Dump Euclids range in capacity from 13 to 25 cu. yds., have top loaded speeds up to 34.4 m.p.h., and diesel engines of 190 to 300 h.p.

The Euclid Scraper has proved its dependability and efficiency on the construction of roads, levees, airports and in open pit mining. The Euclid Loader, teamed with the Euclid Bottom-Dump, has set records for low cost earth moving on a wide range of jobs.

You get more production at less cost with Euclids. Call your Euclid Distributor for help with your off-the-highway hauling problems, or write for information on the complete line of Euclid equipment.

The EUCLID ROAD MACHINERY Co., CLEVELAND 17, OHIO

CABLE ADDRESS: YUKLID — CODE: BENTLEY

EUCLIDS

NOT in the *Contract*

The first grade teacher took one look at Wilmer and knew he was going to give her trouble. But when she started to explain arithmetic to her class, she was pleased to see he was paying close attention. When she had done several problems, she asked: "Are there any questions?"

"Yes," said Wilmer, "Where do them little numbers go when you rub them out?"

Officer: "You interested in a commission?"

Recruit: "No, I'm not too good a shot. I'd rather work on a straight salary."

She: "Does your boy friend have ambitions?"

Her: "He certainly does — ever since he's been knee high."

A number of years ago, Mr. Smith took his wife to the races.

Just as the horses were lining up at the barrier, Mrs. Smith grasped her husband nervously by the arm, and asked if he had a safety pin, at the same time clutching frantically at something near her knees. Just about then someone n e a r b y shouted, "They're off!" Mrs. Smith fainted.

She was "Honey Chile" in New Orleans
The hot spot of the bunch;
But on the old expense account,
She was gas, cigars, and lunch.

A certain lady who had just completed a course in first aid was horrified while walking along to see a man lying flat on his face in the middle of the street. A few spectators were standing around, and the lady was shocked to see no one doing anything for the stricken man.

"Keep c o o l, everybody," she screamed, and rushing to the man, knelt over him and started applying artificial respiration.

Suddenly the man looked up and said, "Lady, it's a tough job getting this wire down this manhole, and you sure aren't helping much."

He was a milkman with a sense of humor. "Why are you so late with our milk, this morning?" asked the elderly lady.

"Well, you see, mum," he answered, "it's like this. The law allows us 25,000 bacteria to the gallon, and you wouldn't believe how long it takes to count the little beggars."

A man died and left $100 each to an Englishman, Irishman and a Scotsman, on condition that they each put $10 in his coffin.

The Englishman dropped in his $10 and the Irishman did likewise. Then along came the Scotsman, who put in the coffin a check for $30 and took out the $20.

Father looked hard at his wife and then at his son. "That boy has taken money from my pocket!" he stormed.

"Ernest," she protested, "how can you say that? Why, I might have done it."

Father shook his head. "No, you didn't; there was some left."

A lad applied for a job at a drugstore. His interviewer began to fill in the form.

"Your name?"

"Henry Ford," answered the boy.

"That's a pretty well-known name, isn't it?"

"It ought to be," said the boy. "I've been delivering groceries around this neighborhood for two years."

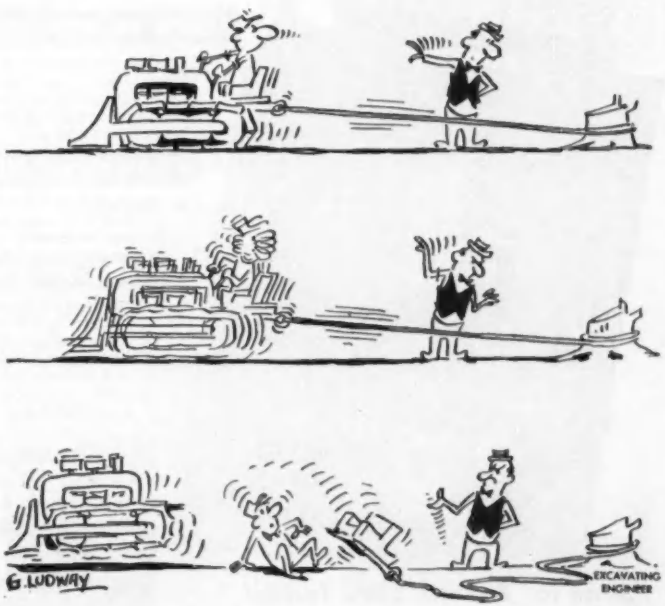
Then there was the man who stepped up to the bar very optimistically, and two hours later went away very misty optically.

Hiker: "Can I catch the 6:45 train if I cut through this field of yours?"

Farmer: "If my bull sees you, you might catch the 6:15!"

Talking of clothes, this from a Belfast (Ireland) paper:

The clothing trade tries to see the funny side of its problems. A story is going the rounds in Belfast about the man who was sent to London by his firm to watch the prices AT THE WOOL SALES. After a few days he wired back: "Some think it will go up, and some think it will go down. I do, too. Whatever you do it will be wrong. Act at once."



New Equipment

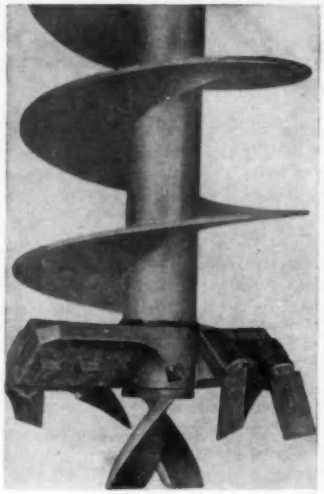
Continued from page 47

Made for semi-drop center rims, the tire fits rim size 800 T, has a cross section 13.2 inches wide with an outside diameter of 50.8 inches, maximum rated load of 6,600 pounds when inflated to 50 pounds pressure, and makes 426 revolutions per mile, all of the data being based on a maximum speed of 25 miles an hour.

Cutting Head for Earth Drill

Manufacturer: Petersen Engineering Co., Santa Clara, Calif.

Claims: A new cutting head for welding onto any continuous helix type earth drill or post hole auger, now in production is designated as the Pengo cutting head. The new unit is of twin helix design. It replaces the conventional cutting head by means of directly welding to the bottom of any continuous helix auger. It is said to work favorably under any kind of ground conditions, but its main features are that it makes it possible to bore holes under adverse conditions with machines using the continuous helix auger. Formerly only the heavier type machines were capable of boring.



The cutting teeth are arranged in the same staggered pattern as provided on the manufacturer's regular heavy duty twin helix earth auger used widely by power and telephone companies. All Pengo cutting head parts are standard and are interchangeable with the standard Pengo earth auger of the same size, including the shank plates, replaceable points, and the fishtail pilot bits.

The cutting heads are available in eight sizes ranging from 10 inches to 24 inches in diameter.

Triple Roll Crusher

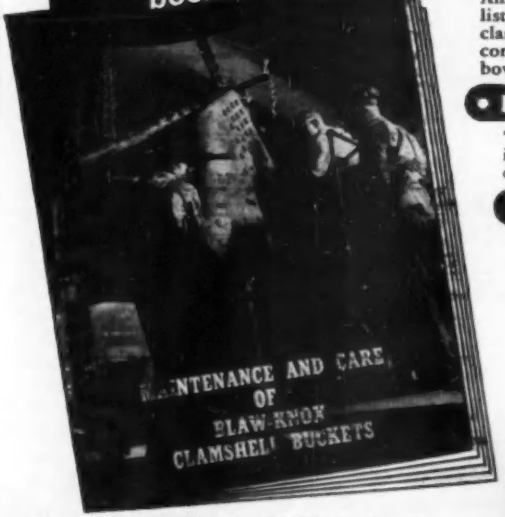
Manufacturer: Pioneer Engineering Works, Inc., Minneapolis 13, Minn.

Claims: A 54 x 24 inch triple roll crusher has been added recently to the Pioneer line. This new crusher is big brother to the 40 x 22 inch and 30 x 18 inch triple roll crushers which have been available for some time.

The new crusher has been designed for reduction crushing behind a 3042, or larger, jaw crusher, and is available either for stationary or portable installations. Because of its high stage of reduction (two stages in one crusher) the 54 x 24 inch triple roll permits greater opening of the jaw crusher setting, thereby increasing plant output.

Stage of reduction varies from 6½ inches to 2 inches when producing minimum sizes of products from 4 inches to ¼ inches minus, respectively. This means that when producing 4 inches minus product, pieces up to 9 x 9 inches can be fed the crusher. When producing ¼ inch minus material,

Here's your new "BUCKET SAVER" booklet



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The ONLY book available that tells...

• HOW TO SAVE YOUR BUCKET

Among the many "bucket saver" suggestions are a list of "do's" and "don'ts" on the use and abuse of clamshell buckets; tips on how to prolong cable life; common operating mistakes that make bucket lips bow in or bend out.

• HOW TO GET MORE OUT OF YOUR BUCKET

"How to Reeve the Bucket for Maximum Efficiency" is illustrated and described in detail. One page is devoted to instructions for operators.

• HOW TO REPAIR BUCKETS

Methods of renewing the cutting edges of worn bucket lips with special welding precautions. This section also contains instructions for removing and replacing ball bearings in lever arm sheaves, lubrication instructions, and many other practical hints for bucket care and maintenance.

BLAW-KNOX DIVISION
of Blaw-Knox Company
2074 Farmers Bank Building • Pittsburgh 22, Pa.

BLAW-KNOX CLAMSHELL BUCKETS
THE MOST COMPLETE RANGE OF SIZES AND TYPES

pieces up to 2¼ x 2¼ inches can be fed.

Nominal production will vary from approximately 35 tph of ¼ inch minus, to 500 tph of 4 inch minus, based on material weighing 2,700 lbs. per cu. yd.

Shot Core Drill

Manufacturer: Acker Drill Co., Scranton, Pa.

Claims: The new shot core drill designated as model KR is a core drill designed to recover cores from any formation—hard or soft up to 20 inches in diameter and depths down to 600 feet.

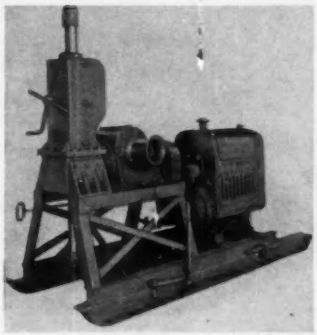
Because shot bits are run to destruction and bit maintenance is negligible, operation is exceptionally economical, particularly in cores 3 inches and over. Operation is simple and no special skill or experience is required of the operator. Drilling is always under the complete control of the operator, who can when necessary, instantly switch to any one of three speeds.

The KR basically consists of a heavy-duty rotary drill head with a three speed transmission, a cargo type hoist and a gear driven positive displacement pump. An effective shot feed system carries the shot down the interior of the drill rods directly to the cutting bit. Drill cuttings are flushed to the surface.

The entire unit can be mounted on drag skid, trailer or truck. Power can be supplied from the power take-off of a jeep or truck, gasoline, kerosene or Diesel engine, air or electric motor.

A 15 or 25 foot derrick can be supplied with the unit and for portability the complete unit with tower can be mounted on jeep, trailer or drag.

The KR is especially suited for drilling tube and artesian wells, in hard formations. For subsurface exploration, the KR will recover cores from any substance ranging from sand to granite.



The KR drill is particularly sucessful in recovering test cores from highways, airfields or large masonry or concrete structures. Steel reinforcement bars offer no obstacle to the KR shot core drill. Large size test cylinders are quickly and easily recovered from concrete having such reinforcement.

"And then again, it may be just a rock formation."

15-Ton Truck

Manufacturer: Cook Bros. Equipment Co., 1815 N. Broadway, Los Angeles 31, Calif.

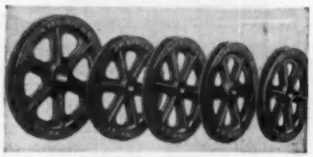
Claims: A new, single passenger truck, the "M310," designed especially for work where a short wheelbase and large payload capacity are important has been introduced. The unit has a lightweight, high-tensile steel dump body with a legal payload capacity of 15 tons. The wheelbase is 174 inches and it is equipped with a dual hydraulic hoist and dual gear drive. The "M310" trucks will also be available with a single driving axle or single driving axle with third axle attachment.

Re-designed Front Axle

Manufacturer: United Manufacturing Co., 48 W. Interstate St., Bedford, Ohio.

Claims: The design and production of a new front axle assembly in the Caravan line of four-wheel running gear has been announced. This new model 2-A axle features a turning radius as much as 45°, depending upon track width and spring location. In addition, greater stability is obtained by heavier overall construction and incorporation of extra-heavy 1¾-in. center arm stops.

These automotive type assemblies have capacities ranging from 10,000 to 12,000 pounds. They are recommended for applications where maximum stability is required such as han-



Everything in

SHEAVES

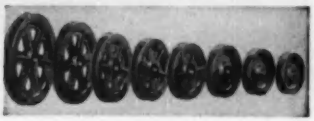
for wire rope

PROTECT YOUR WIRE ROPE with genuine American Hoist replacement sheaves. Same top quality used on all American Hoist cranes and other big name equipment. Complete stocks, all types and sizes. Prompt shipment from either St. Paul or So. Kearny plant.

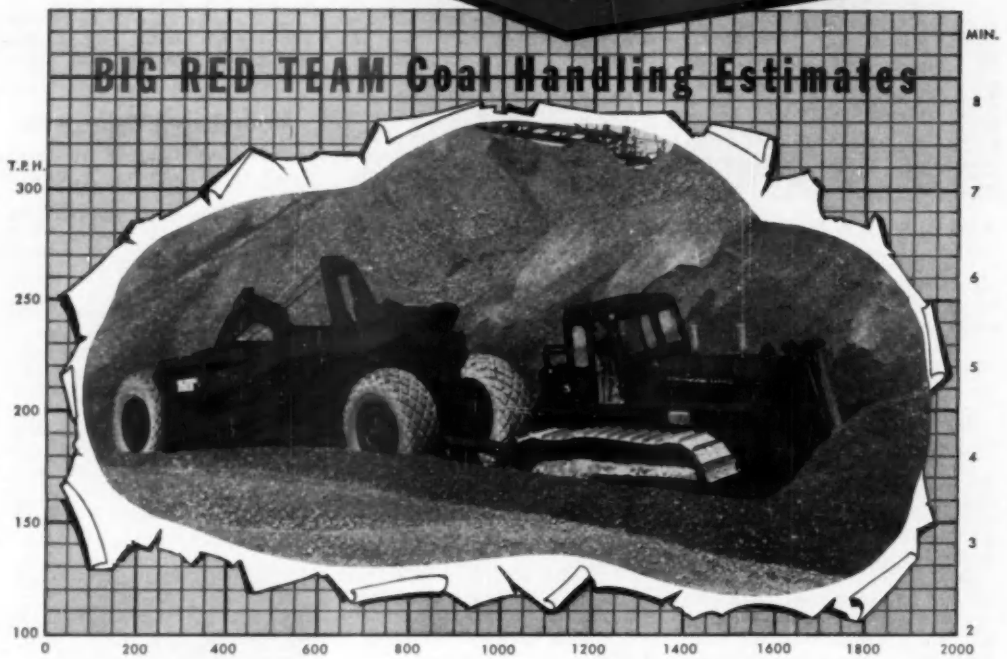
American Hoist & Derrick Company

SAINT PAUL 1, MINNESOTA

SO. KEARNY, NEW JERSEY



Now FIND OUT ABOUT



LOOKING for ways to increase coal handling efficiency? . . . to reduce coal handling costs? Then ask your International Industrial Tractor distributor for information on the BIG RED Team — International TD-24 tractor and Bucyrus-Erie B-170A or B-250 scrapers. He can give you facts and figures to show how the BIG RED Team is helping other utilities to achieve faster, cheaper, more profitable operations . . . and how it can do the same on yours!

Bucyrus-Erie scrapers are ideal for moving and stock-piling coal because they load fast, dump easily, provide superior compaction of coal to prevent combustion. "Boiling Action" loading provides heaping loads every pass; the two-part hinged apron is easily adjusted to give a wide dump opening . . . and the big capacities of these scrapers (16 yd. for B-170A; 22-yd. for B-250) means moving more coal faster.

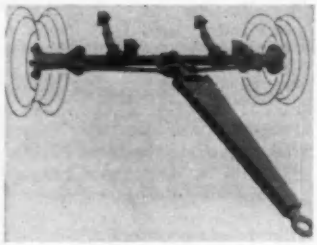
If your operation does not require the big B-170A or B-250, there are Bucyrus-Erie scrapers and International Tractors of smaller sizes and capacities to fit your needs. See your nearby International Industrial Tractor distributor today.

289T51C

BUCYRUS ERIE SOUTH MILWAUKEE, WISCONSIN

dling air compressors, heavy-duty generators, pumps, tar kettles, concrete mixers, military field units and other mobile equipment.

Inside wheel turning angle of this new axle is 35° to 45°, depending upon model. This wide angle decreases the turning radius for the same wheel base and track, and as a result increas-



es maneuverability. Increased wheel turning angle also increases the draw bar turning angle and reduces the possibility of jack-knifing.

All turn-stopping stress and strain has been eliminated from knuckles and tie rods by locating durable 1¾-in. round steel stop blocks on center area which has been test-proven for proper strength.

Additional new features incorporated in the 2-A assembly include complete symmetry of steering arm to guard against eccentric loads, utilization of a rounded stop boss to assure line contact with axle stop, and incorporation of a heavy flange on center arm to resist any bending tendency when turn is stopped.

In addition, maximum strength has been built into the steering knuckle to resist severe off-the-road strains. The arm contour is designed to allow wide turning angle without knuckle and tie rod yoke interference.

Truck Line

Manufacturer: Federal Motor Truck Co., Detroit 9, Mich.

Claims: Production of its new 3400 series with "Power Chief" valve-in-head engine, has been announced by the Federal Motor Truck Co.

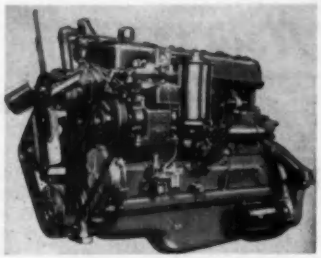
The high power output and comparative low chassis weight of these vehicles is significant.

The new series will be comprised of three models, 3401, 3402 and 3404, all of which represent important additions to the Federal line. Gross vehicle weights range from 23,000 to 25,000 lbs., with tractor-trailer ratings to 45,000 lbs., depending on models. Units will be available in eight wheelbase lengths from 136 inches to 250 inches with cab to axle dimensions from 60½ inches to 174½ inches. Chassis and cab weight of shortest wheelbase 3400 series units start at 7,210 lbs.

The new "Power Chief" six-cylinder, valve-in-head engine is engineered to provide increased power output and peak fuel economy under all operating conditions. The performance demonstrated by this gasoline engine is also reflected in its faster acceleration and ample reserve power on the job. Engine has 371 cubic inches displacement and develops 145 horsepower at 3,000 and 297 lbs. ft. torque at 1,400 rpm.

Engine features include improved valving and positive valve rotation, sodium cooled and stellite faced exhaust valves with bronze guides, durable valve inserts, built-in oil cooler, new high-lift camshaft, full length water jacketing and effective system of directional cooling.

A major factor contributing to the high power, smooth operation and excellent economy of this engine is the combination of duplex carburetor, improved manifolding with climatic adjustment and individual porting system which assures proper atomization and uniform distribution of fuel mixture into each cylinder.



The 3400 series is built to meet today's transportation needs with more than 100 features incorporated into its design. Cab, of all steel construction, is unusually wide with one-piece full vision windshield, deep cushioned double-life seats and draft-free ventilation. Maximum driver convenience and safety have been engineered throughout these units.

Frames have deep thick channels with sturdy cross-members and front bumper is frame-mounted for extra durability. Cab is rubber mounted and of floating ride construction. Hood, radiator and fenders are virtually a part of the cab assembly providing extra strength and life to sheet metal.

"We keep a constant check on everything on the project."

New trade literature

Title: **Planned Lubrication**
Subject: A 2-color, 20-page bulletin, gives full details on seven specialized lubricants covering the majority of requirements with a minimum of different types and densities. Information presented includes: lubricant characteristics, benefits, uses, densities, specifications and container sizes. Products covered are lubricants for ball and roller bearings, plain and ring bearings, open gears, enclosed gears, speed reducers, and oils for cleaning, loosening and penetrating.
Where to get: Keystone Lubricating Co., 21st, Clearfield and Lippincott Sts., Philadelphia 32, Pa. (Bulletin No. BK-19)

Title: **Industrial Transportation Catalog**
Subject: A new four-page leaflet picturing off-highway trailers and truck bodies, mine and quarry cars, rocker dump cars and trailers, light industrial cars, and trailers, electric industrial trucks, heavy duty industrial cars and heavy duty intraplant trailers.
Where to get: Easton Car & Construction Co., Easton, Pa. (Catalog No. 2)

Title: **The Dependable Diesel**
Subject: The new issue of this magazine presents actual case histories of the performance of Cummins Diesels in a variety of applications. Coal field, iron range and construction uses are discussed.
Where to get: Cummins Engine Co., Inc., Columbus, Ind.

Title: **Welding Accessories Catalog**
Subject: A 16 page, arc welding accessories catalog contains the complete line of the manufacturer's arc welding accessories and supplies.
Where to get: Hobart Brothers Co., Troy, O.

Title: **Excavator Catalog**
Subject: Latest advancements made on the Koehring Model 304 ¾ yd. excavator and its attachments are described in this new catalog. The two-color booklet contains 117 illustrations and drawings depicting the design, construction, work capacity and application of the excavator. Numerous action photographs are used in the new catalog along with a selection of machine part pictures. Included are descriptions of such features as self-cleaning crawler shoes, skeleton type tapered drum lagging, automatic boom hoist brake, mechanical booster clutch, continuous chain crowd, full rotating fairlead and the safe power boom lowering device.
Where to get: Koehring Co., Milwaukee 16, Wis.

Title: **Rubber Tired Bulldozer**
Subject: A two color folder that describes the manufacturer's cable controlled bulldozer No. 10S. Included are operation pictures, cutaway drawings and sketches. Also included on the spread page is a list of specifications.
Where to get: Caterpillar Tractor Co., Peoria, Ill.

Title: **Scraper Catalog**
Subject: A new catalog describes the model TS300 rubber-tired, self-propelled scraper. The catalog is 16 pages in length, printed in two colors. The copy and photographs explain the construction features of the scraper in full detail. Individual photographs of the various component parts are included. The center spread is devoted to a large model shot of the scraper and complete machine specifications.
Where to get: LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Ia. (Form No. A-1285)

Title: **Diesel Crawler**
Subject: Catalog contains detailed specifications and information on how International TD-9 tractor develops and applies its 40.5 drawbar horsepower. Several varied job application scenes appear in the publication along with information on construction and operating features.
Where to Get: International Harvester Co., 180 N. Mich. Ave., Chicago 51, Ill. (Form CR-313-A)

Title: **Steam Cleaners**
Subject: A new, 4-page catalog-in-brief, outlines uses and benefits of the entire Malsbary steam cleaner line. The catalog describes differences between the steam vapor and the heavy-duty models, suggests where each model best fits, contains an easy-to-compare chart of pressures and capacities and temperatures, and lists standard accessories.
Where to get: Malsbary Manufacturing Co., Oakland 3, Calif. (Free)

"I wonder why those men aren't working?"

TO ADVERTISE: All advertising in this section is payable in advance. Rates: 60c per line, or $7.20 per inch of 12 lines. Minimum charge $2.40. No discounts; no commissions. Please count your copy carefully to avoid delay. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Be sure to enclose the correct amount of money with your order. Closing date — 15th of preceding month. Example: January closes December 15th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

Bucyrus-Erie Model 5-W diesel dragline.
Bucyrus-Erie Model 9-W diesel dragline.
Bucyrus-Erie 120-B Ward-Leonard electric shovel.
Bucyrus-Erie 44-B diesel shovel and dragline.
Western location. Box 3463

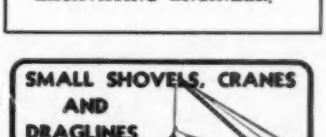
Lima 1201 — 3½ yard diesel shovel including spare dipper and handle. Three years old, good operating condition. Located Northern Minnesota. Box 3468

Bucyrus-Erie 750-B. Good operating condition. East central location; inquire Box 3460 c/o EXCAVATING ENGINEER.

FOR SALE

750-B BUCYRUS-ERIE 16 cu. yd. electric shovel, full Ward-Leonard.

This machine will become available in September, 1951. Good stock of spare parts. Located in Middlewest. Inquiry Box No. 3438, c/o EXCAVATING ENGINEER.



Insley Model K-12 new 1947 with Chrysler gas engine, 50 ft. boom, 15 ft. jib, ½-yd. combination dragline lifting crane and backhoe, machine in good condition. Box 3466

Bucyrus-Erie model 54-B dragline with long cats and high gantry for sale. This unit used for four months. Located in the southern coastal section of Virginia.

Bemiss Equipment Corporation
P. O. Box 960 Roanoke, Virginia
Phone 3-3185

P&H Model 255-A, new 1948 ¾-yd dragline, Waukesha gas motor with 45 ft. boom including ¾-yd. Page dragline bucket, 26 inch treads, serial Number 12676; in good condition. Box 3465

We Specialize
On Exclusively Used

mechanically sound, late model diesel Bucyrus-Erie and Northwest shovels, cranes, draglines and pullshovels. Our list of Bucyrus-Erie 15-B's, 22-B's, 38-B's and 54-B's and Northwest 25's, 6's, 80-D's and 95 machines are a most complete and comprehensive inventory of used machines of these models available. We also list walking draglines and all attachments.

J. C. French Company
226 Berry Parkway Park Ridge, Illinois
Tel. TAcott 3-4927

Bucyrus-Erie Model 15-B combination shovel backhoe. 23000 series serial number. Machine now working and represented in good condition.

D. D. Kennedy, Inc.
P. O. Box 278 Bellwood, Illinois
Phone Chicago—Estebrook 8-5223

P&H Model 600 shovel and backhoe combination with gasoline engine. Capacity 1¼ cu. yd. Available for rent or sale. SALE PRICE FOB LOUISVILLE, KY. $8500.

Brandeis Machinery & Supply Co. Inc.
Brook and Warnock Sts. Louisville 8, Ky.

Northwest model 25; 6; 80D; 95. Manitowoc 6500; 4500 new — will rent. Bucyrus 54-B; Monighan 6W; 7W; 9W; 450.

A. W. Nevers Phone 32 Mt. Pleasant, Iowa

Used Bucyrus-Erie Model 51-B two-cubic yard shovel; standard equipped; 30" threads; Caterpillar D-17,000 power; current model, new 1947; located Denver, Colorado. Box 3462

Bucyrus-Erie 10-B dragline w/bucket No. 17899 Buda gas engine overhauled 1950; includes backhoe attachment 3 years old. Total price $7500 cash. Also 1944 KB-7 dump truck and home-made heavy low trailer for sale at $1000. Will sell 10-B complete w/truck and trailer for $8000.

Mrs. R. C. Henderson, 135-6th Ave., Marion, Ia.

MISC. FOR SALE

Buda HBL deep hole earth augering machine. Purchased in 1950 and used 150 days on U. S. Government job. Unit mounted on a 1½-ton 1941 Mack truck and capable of drilling 14" hole—60 ft. deep; 9" hole—90 ft. deep; 6" hole—150 ft. deep. Complete with 60 ft. of 14" flights and 100 ft. of 6" flights and all necessary operating tools. Unit in A-1 condition. Attractive price. Contact

Diehl Pump & Supply Company
800 Fehr Avenue
Louisville, Kentucky

Plymouth 35-ton gasoline locomotive, std. ga.
B-Erie 52B 2¼-yd. diesel shovel-dragline.
Whirley portal gantry cranes, elec. (4).
Locomotive cranes, diesel 30 and 40 tons.
Walking draglines, 3, 5, 6 and 10 yd.
B-Erie H-3 Hydrocrane, 3-ton, used 3 mos.
Euclid rear dump trucks, 15 to 32 tons.
Crushers, gyratory, jaw, cone (7).
Cement bins (2), 100-ton and 400 bbls.
Shovels, draglines, cranes, 1¼- to 7½-yd.
Pioneer 305W gravel washing plant.
P&H 1055 drgl., and 955 crane; diesel.
Locomotives, 7, 20, 30, 55 tons, gas, diesel.
B-Erie shovel front att., 2¼-yd., 52B-55B.
H. Y. Smith Co., 828 N. B'way, Milw. 2, Wis.

D-4 Cat tractor with one-cubic yard Traxcavator endloader serial number 7-U-6185, two years old in excellent condition.

Martin 2-axle, 8 tires, 10-ton Low-boy drawbar type trailer serial number 3460, six years old in good condition.

Diamond T 2½-ton 5-cubic yard body dump truck with tow hook to pull above trailer.

Complete outfit to do business.

Riemer Brothers, Inc.
6301 West Fletcher Chicago 34, Illinois

5—5 hp D.C. motors, 115 volt roller bearings.
1—1 hp centrifugal pump and motor D.C. 115 volt.
1—5 hp centrifugal pump and motor D.C. 230 volt.
3—2 hp York Freon refrigeration compressors air cooled.
1—5 hp D.C. motor 115 volt.
50 feet 8" Goodrich type 400 GM synthetic hose; full suction or pressure, working pressure 200 pounds; oil, gas, water, sand, etc. New.
Navy surplus, 50 off list. All above in good shape.

Louis Devlin
6208 Santa Fe Ave., Huntington Park, Calif., KI 5377

McCarthy horisontal highwall drill.
McCarthy vertical highwall drill.
Lincoln welder on mount (with attachments).
2 Bulldozers.
2 LeTourneau Tournapulls.

Frank W. Albert
P. O. Box 291
Phillipsburg, Pa. Phillipsburg 1462

A Bargain In Euclids

Six (6) Model 25 FTD EUCLIDS with Bottom Dump Wagons 165 H.P. Cummins diesel engines. All units rebuilt in our shop. Tires ranging from good to excellent. Will sell individually or in one lot.

Write or phone for prices.

H. O. Penn Machinery Company, Inc.
140th Street and East River
New York 54, N. Y.
Telephone: CYpress 2-4800

Bucyrus-Erie 22-B shovel attachment, new, unused; contact D. D. Kennedy, Inc., P. O. Box 278, Bellwood, Illinois, or phone Hillside 2520.

7000 feet shielded preassembled aerial cable, 5 KV 2-0, three conductor w/copper shielded tape. Used, but in good condition. Corona resisting rubber insulation Box 3461

HELP WANTED

Experienced Salesman-Manager, sand and gravel plant. $500 per month, car furnished. References required.

702 McBirney Building
Tulsa, Oklahoma

POSITIONS WANTED

General superintendent or superintendent available; 30 years experience and qualifications; supervising, estimating, and building all types highways, airports, heavy excavating, large sewers, earth-filled dams, levies, covering several states. Honest, sober, and reliable, know cost and equipment. Interpret plans and organizing. Box 3464

Looking for a job as master mechanic or traveling mechanic. Will also take a job as shovel crane or dragline operator—must be steady job. Do not care too much to go outside of the USA. Can rebuild any and all machines. Can also run concrete mixers. 40 years experience. Box 3459

Position wanted as shovel, dragline, clamshell or pile driver operator. Have operated gas, steam and diesel large and small machines. Prefer steady work. P. O. Box 8, Hurricane, West Virginia. Phone 2224-Hurricane.

Notes from the manufacturers

Lincoln Electric Co., Cleveland, Ohio, recently moved into their new plant at 22801 St. Clair Ave., Cleveland, without losing more than 10% of production for the month during which the complete move was made. Production on each machine picked up at the new plant a few hours after stopping at the old. Raw material was moved out first while machines at the old plant were kept operating on the month's work which was in process. The basic machines, shears and presses, ran out of work first and they were moved to the new location where they began to work on the raw material previously stocked there. As material was processed through the old plant and machines ran dry they were moved out to begin on the raw material which had been started in process by the first machines moved out. Operators went along with their machines which were quickly set into marked locations and hooked into the power lines. At the end of the third week practically all of the material in the old plant had been processed and assembled into welders. The assembly lines were then moved to the new location where parts were ready for assembly. The move of the company's machine division, now complete, has involved tons of material and some 1,500 machines.

Chain Belt Co., Milwaukee, Wis., announced the appointment of the Cate Equipment Co. as its new district sales office in the Salt Lake City, Utah area. For the past 18 months Cate Equipment Co. has served as a distributor for the manufacturer's chains and sprockets. Belt conveyor idlers and power transmission equipment. As a district sales office, it will continue to maintain its distributor status and carry stocks of these items for prompt local service. Located at 49 E. Ninth So., in Salt Lake City, the company also maintains stock at Price, Utah.

Koehring Co., Milwaukee, Wis., has recently appointed the A. F. Deaney Co. of Indianapolis, Ind., as distributor for the complete Koehring line of heavy-duty construction equipment. The firm also represents C. S. Johnson Co. of Champaign, Ill., and Parsons Co. of Newton, Ia., both Koehring subsidiaries. A. F. Deaney is president of the organization and Ralph Riddle is in charge of sales. Sales and service departments are located at 719-721 N. Pine St. in Indianapolis. The Deaney Co. will cover all of Indiana with the exception of six counties in the northwest corner and six border counties in the southeast. With the addition of the new line, the following construction equipment units will be handled: excavators, cranes, draglines, Dumptor, pavers, finishers, Mud-Jacks and construction mixers, aggregate and cement plants, batchers, bins, storage silos, clamshell and concrete buckets and crawler and rubber mounted Trenchliners for trench excavation.

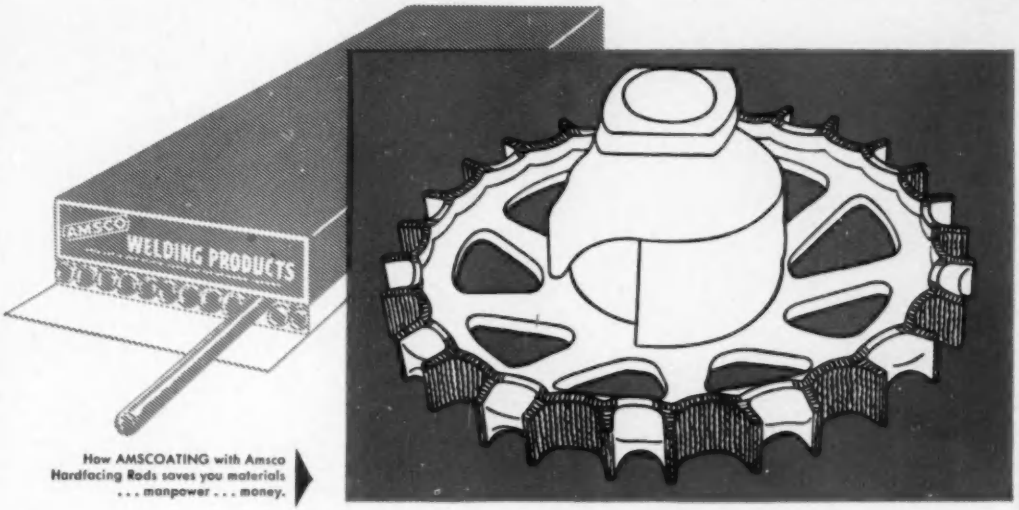
Worthington Pump and Machinery Corp., Harrison, N. J., have a contract with Dalhoff and King, Wellington, New Zealand, to handle their well pumps, welding positioners, multi-V drives, road construction equipment and YC compressors. They will be distributors for this equipment in New Zealand and the Fiji Islands.

Atlas Powder Co., Wilmington, Del., announces the appointment of James A. Gilruth as manager of its advertising and sales promotion division. Gilruth was associated with the advertising department of Atlas for 10 years until 1946, when he became sales promotion manager of the storage battery division of Philco Corp., later Gould-National Batteries, Inc., at Trenton, N. J. Since June, 1950, he has been a senior editor on the staff of Harry W. Smith, Inc., New York technical publicity firm. Gardner Harvey, who has been acting manager of Atlas advertising and public relations division, is assisting in an advisory capacity with the reorganization of advertising and public relations functions for a short time. Following this he will be granted a leave of absence. Gilruth is a member of Eastern Industrial Advertisers, of Philadelphia, the National Industrial Advertisers Association, and the American Material Handling Society.

New York Belting and Packing Co., Passaic, N. J. has appointed Wenzel A. Lindfors as sales manager. He will make his headquarters in the company's Passaic plant. In his new capacity, Lindfors will direct all sales for the company's line of industrial rubber products such as transmission, conveyor and elevator belting, water, air and gasoline hose, packing, molded and extruded goods. Until the time of his present appointment, he was factory representative for N. Y. Belting and Packing Co. in Minnesota, northern Wisconsin, North and South Dakota and northern Iowa.

Bucyrus-Erie Co., South Milwaukee, Wis., has appointed Ray-Brooks Machinery Co., Inc., of Montgomery, Alabama and the Tractor & Equipment Co., Inc., of Birmingham, Alabama, distributors for the Bucyrus-Erie line of ⅜ to 4-yard gasoline, Diesel and single motor electric convertible excavators, the 3-ton Hydrocrane and the recently introduced Hydrohoe. Both firms also handle Bucyrus-Erie tractor equipment — Bullgraders, bulldozers, Dozer-Shovels, and scrapers designed for use with International crawler tractors. Tractor and Equipment Co., serves the northern half of Alabama. Ray-Brooks Machinery Co. with branches in Mobile and Pensacola serves a territory which includes the southern half of Alabama and that part of Florida west of the Apalachicola river. The territories are divided at the northern boundary lines of the counties of Sumter, Greene, Hale, Perry, Chilton, Coosa, Tallapoosa and Chambers. These distributors have long maintained policies of supporting sales with outstanding service. Their staffs of experienced personnel are anxious to provide Alabama and Florida contractors with information and advice on earth-moving problems and equipment.

Cummins Engine Co., Inc., Columbus, Ind., has transferred two sales engineers from the factory to Cummins regional liaison offices as assistant regional managers. R. A. D'Amour has been appointed assistant regional manager, Washington, D. C., and G. W. Plondke has been appointed to this post for the central region with offices in Chicago. D'Amour started with Cummins in August, 1948 as a trainee engineer, and was made a sales engineer in May, 1949. He graduated from Michigan College of Mining and Technology, Houghton, Michigan, with a B.S.M.E. degree in June, 1948. A veteran of World War II, D'Amour served in the navy, from October, 1942 to January, 1946. Plondke, graduated from George Washington University, Washington, D. C., in June, 1948, with a B.S. M.E. degree, and became affiliated with Cummins at that time. Following a trainee period, he was made a sales engineer in February, 1949. Plondke served as a Naval Air Force pilot during World War II.



How AMSCOATING with Amsco Hardfacing Rods saves you materials . . . manpower . . . money.

These teeth take bites out of repair costs!

AMSCOATING can make old Tractor Drive Sprockets last 3 times longer than new.

Here's another way to beat the high cost of replacements, down-time and maintenance . . . AMSCOATING the teeth on Tractor Drive Sprockets. Time after time service records have shown that AMSCOATING of sprockets results in these dollar-saving advantages:

1. ***On an average — 3 times the service life of a new, unhardfaced sprocket.***
2. ***2 out of 3 sprocket changes completely eliminated . . . far less down-time, less maintenance . . . more equipment out of the shop and on the job.***

To top it off, sprocket replacements can practically be eliminated. An AMSCOATED sprocket can be reclaimed over and over again . . . *at about half the cost of a new one!*

Get all the facts on how to make these big savings . . . write today for instruction sheet on AMSCOATING sprockets, and the name of your nearest AMSCO Distributor.

AMSCOATING...stands for control of wear by Hardfacing...

Hardfacing rods—and recommendations for their use—are as sound as the manufacturer who makes them. AMSCO has been fighting wear for a half-century—first with Manganese Steel, and later with AMSCO Hardfacing Products.

If you have a problem of wear caused by impact, abrasion, heat or corrosion . . .

Find out how AMSCOATING can save you materials . . . manpower . . . money!

AMSCOATING

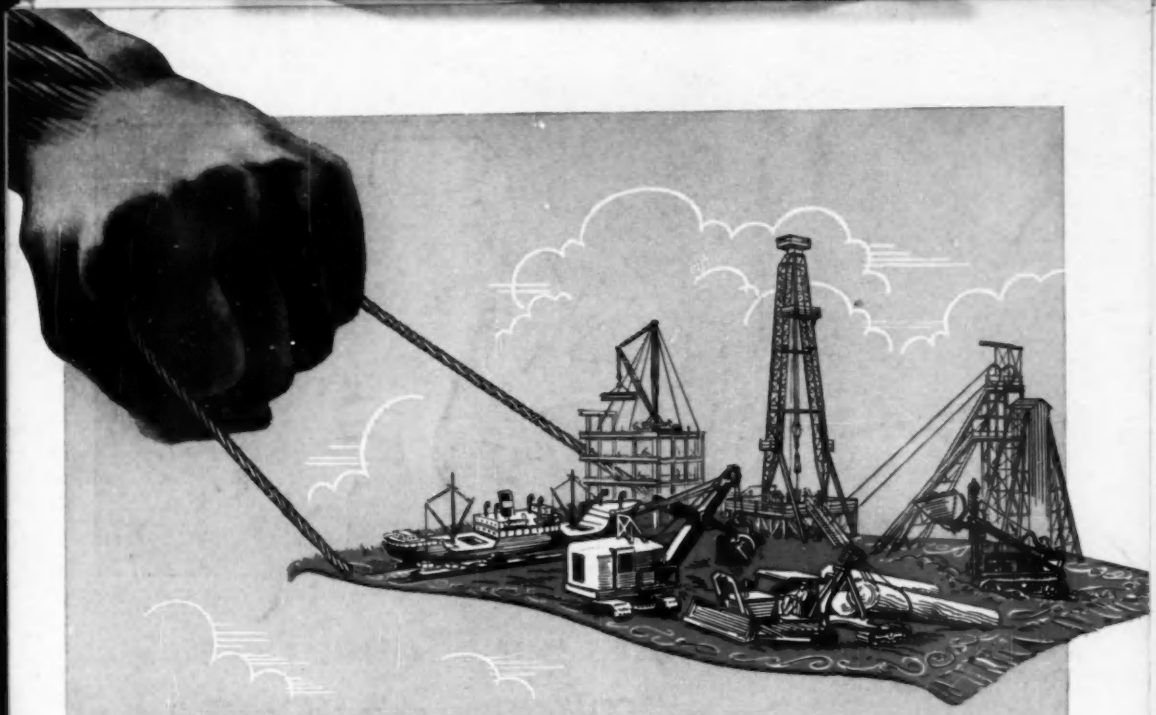
THE RIGHT WAY TO SAY HARDFACING

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION

373 EAST 14th STREET • CHICAGO HEIGHTS, ILL.

Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis. In Canada: Joliette Steel Division, Joliette, Que. Amsco Welding Products distributed in Canada by Canadian Liquid Air Co., Ltd.



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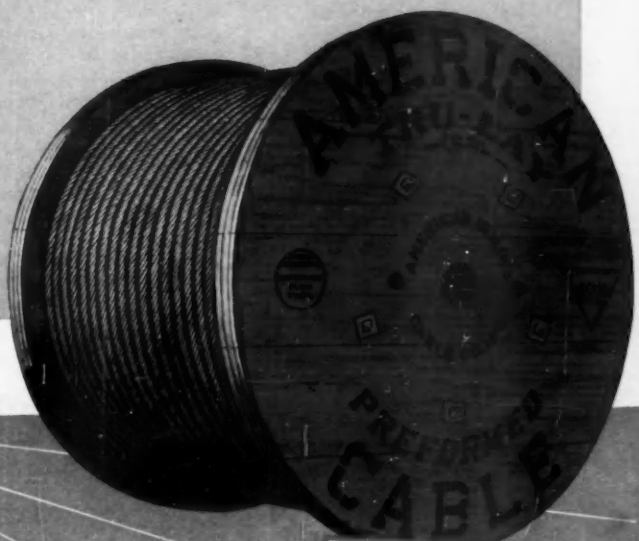
- **PERFORMS BETTER**
- **HANDLES EASIER**
- **SAFER TO USE**
- **LASTS LONGER**

Available
through Distributors
ALL AROUND AMERICA



ACCO

Wilkes-Barre, Pa., Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

AMERICAN CHAIN & CABLE
AMERICAN CABLE DIVISION

In Business for Your Safety

ALSO MAKERS OF THE COMPLETE LINE OF
ACCO **Registered**
WIRE ROPE SLINGS